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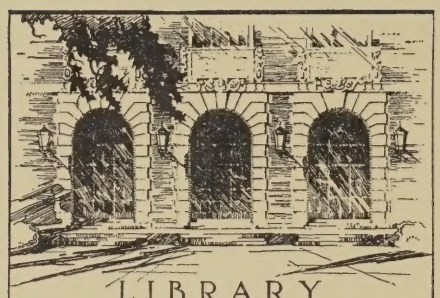

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National Builder

ESTABLISHED 1864

Volume 66 **January, 1923** **Number 1**

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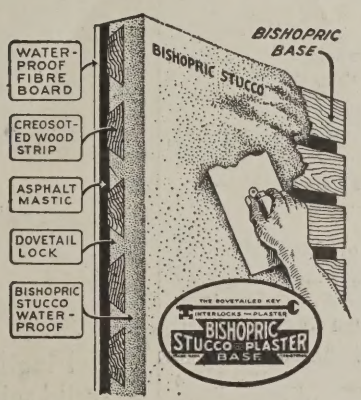

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Volume 66 CHICAGO, JANUARY, 1923 Number 1

Capitalizing Fine Points in House Equipment

How the Bison City Building Corporation of Buffalo, New York, Finances and Sells Houses Equipped with Weather Strips, Electric Heaters and Other Specialties

MERCHANDISING houses by progressive builders and real estate men in some of our big cities is getting to be as much of an art and a science as merchandising automobiles. Up-to-date house salesmen realize that in the competitive business of building and selling houses, houses must have sales points, in much the same way as horses and automobiles.

With the highest class of house building it may often be good business not to carry the finishing and equipment too far, as discriminating purchasers often have tastes and inclinations that have to be taken into account. On the other hand, there is a large class of buyers, especially in cities, which is more impressed with the completeness and effectiveness of the equipment already installed and included in the purchase price, than with the possibility for the exercise of their own tastes and inclinations. When dealing with this class evidently the builder who goes the farthest in the way of equipment has the best selling arguments.

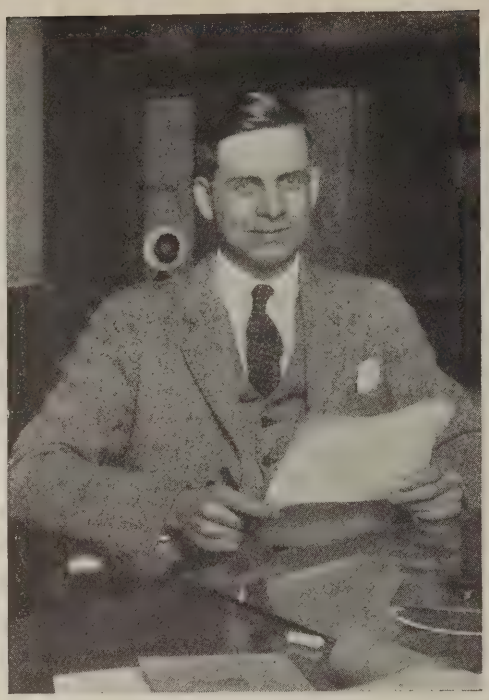
The Bison City Building Co., Buffalo, N. Y., is the construction organization for one of the largest real estate operators in the city—Pearce and Pearce, Inc. Besides dealing in all kinds of real estate, this concern sells annually several hundred houses built exclusively for the firm by this subsidiary. The building organization operates as a contractor and charges the real estate firm, by which it is controlled, a reasonable profit. C. E. Nichols is vice-president of the construction company, and R. G. Bainbridge,

Exhibit at the Buffalo building show. Advertising is effectively used by Pearce and Pearce, Inc., and the Bison City Building Corporation

an architect and builder, whose work was described in the November NATIONAL BUILDER, page 44, is general superintendent.

The system of operation is as follows: Acreage, or a block of lots, is bought by the building company. These are developed and built upon as a group. For example several city blocks on Lisbon Heights, in the university section of Buffalo, were developed in 1922. A group of these houses is shown in an accompanying illustration, and three typical houses in this group are shown in detail.

C. E. Nichols, vice-president and manager, Bison City Building Corporation



Howard W. Pearce, secretary-treasurer

Unique System of Financing Building Work

Mr. Nichols has worked out a system of financing large scale building operations which is quite original and highly successful. The essence of his scheme is the payment of building material dealers, plumbing contractors, electrical contractors, etc., with notes secured by first mortgages on houses *to be built* or under construction.

For example a contract is entered into with an excavating contractor to dig all the cellars of a row of houses. This contractor accepts a first mortgage on House No. 1 as security for the payment of his contract. As soon as the cellar of House No. 1 is done a contract is let for the concrete blocks for the foundation walls. The concrete block contractor, we say, as an example, accepts a first mortgage note on House No. 2 as his security. The lumber dealer, for material furnished for all the houses, accepts first mortgages on Houses Nos. 3, 4, 5 and 6. The plumbing contractor gets first mortgages on Houses Nos. 7, 8 and 9, and so on

A. B. Weaver, architect, Bison City Building Corporation

Row of Lisbon Avenue houses under construction by the Bison City Building Corporation

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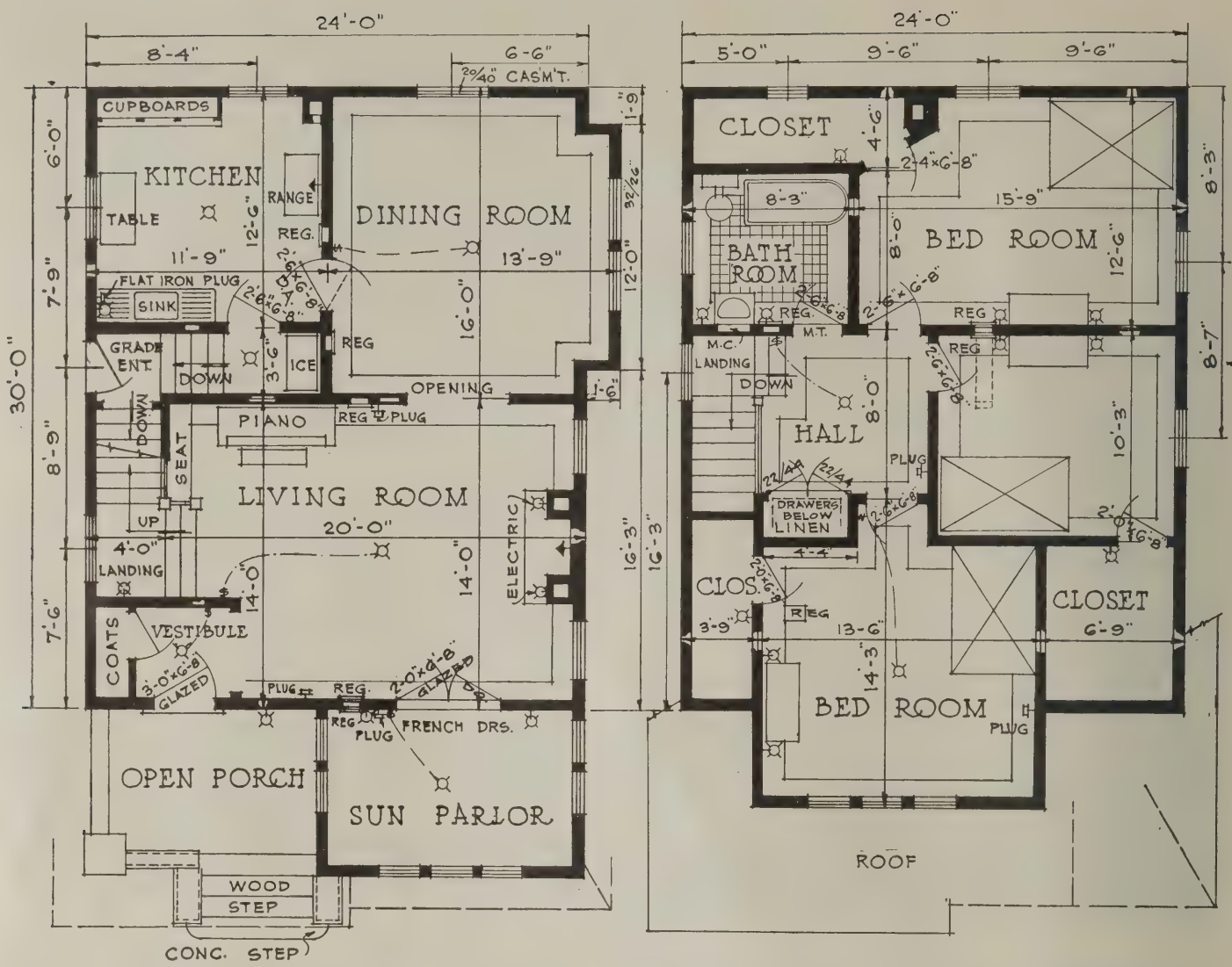
House No. 906-6 and interior views. See plan on page 16

down the line of all the houses planned for.

As soon as House No. 1 is completed, probably within 45 days at most, the cellar excavating contractor takes his first mortgage on the now completed house to a savings bank, which will readily pay him cash for it. So as each successive house is finished the material man or subcontractor cashes in his first mortgage security. In this way each contracting party has ample security; and has in addition a very direct interest in seeing the work completed expeditiously and efficiently.

The Bison City Building Corporation purchases all materials and equipment direct, but subcontracts the installation of such equipment as plumbing, heating and electric wiring. This gives all the advantages of buying in large quantities under the most favorable conditions, without the necessity of maintaining too elaborate a construction organization. The carpenter work is done by the building company's own crew under the immediate supervision of Mr. Bainbridge.

The lots in the Lisbon Avenue development are 35x110 ft. and run about $75 per front foot. The houses and lots complete



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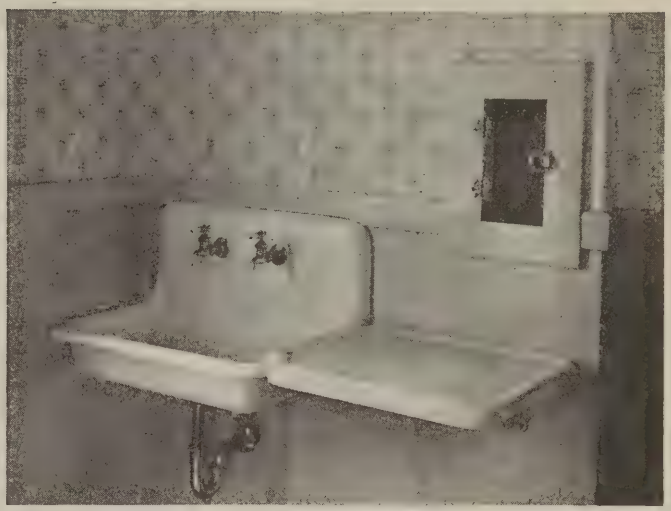
Plan of House No. 906-6

sell for $8,000 to $10,000. The first mortgage is for about 50 per cent of the purchase price and bears interest at 6 per cent. The second mortgage is usually 50 per cent of the first mortgage, or 25 per cent of the purchase price; and is ordinarily accepted by the original owner of the real estate as his share in the development project. This second mortgage bears interest at 6 per cent and its term is three years, payable with interest in monthly installments of $25 to $30.

House No. 912-8 and living room. See other interior views and plans on pages 17 and 18



Interior views of House No. 912-8

The balance of the purchase price, including builder's profit, is in the cash payment and a third mortgage, also at 6 per cent, with a 3-year term, payable with interest monthly by installments of $10 to $15. This is held by the company until maturity.

Summarizing, for example the case of an $8000 house and lot:

Price	$8000
Cash payment	$1000
Balance	$7000

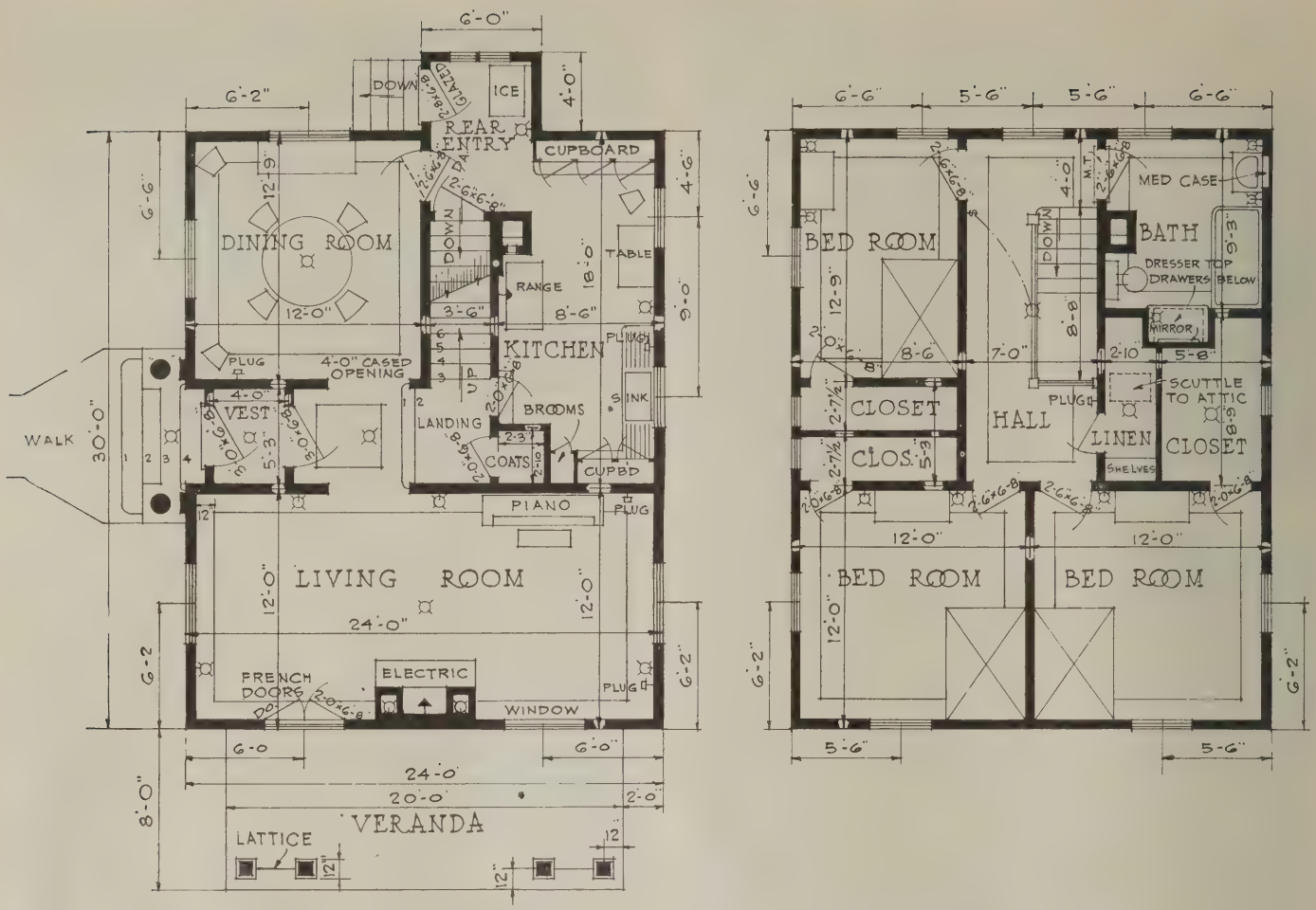
MONTHLY PAYMENTS LIKE RENT

First mortgage ($4000), interest	$20
Second mortgage ($2000), interest	10

Typical furnace

Typical delivery recess

Typical plumbing



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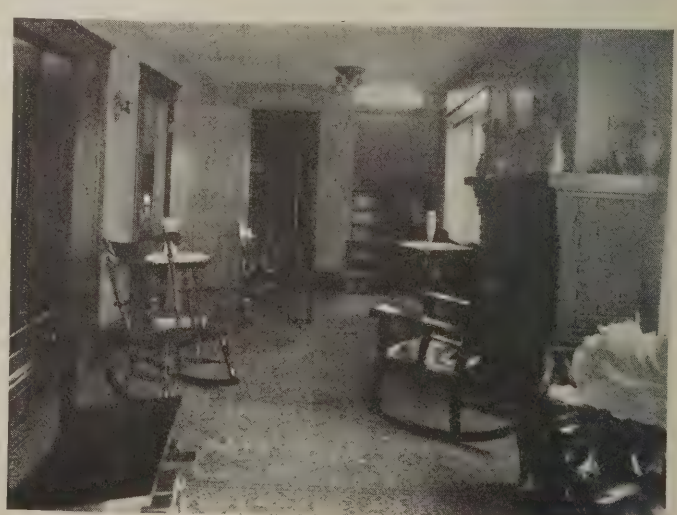
Floor plans of House No. 912-8

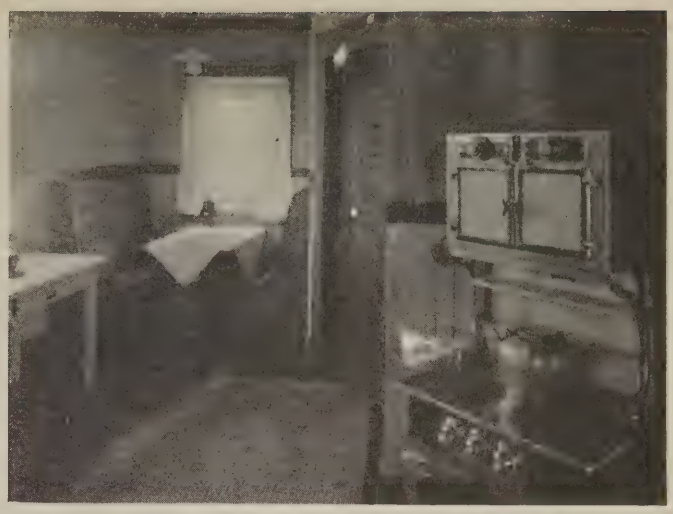
Principal	25
Third mortgage ($1000), interest	5
Principal	10
Total monthly payment	$70

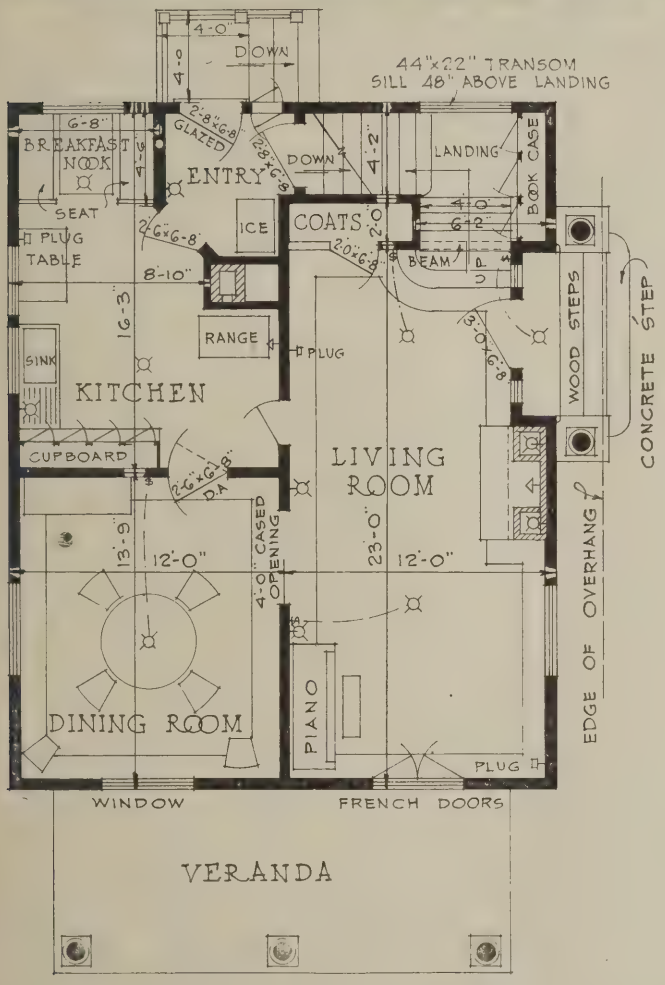
The above outline is not strictly correct for the $8000 would have to include the price of financing first and second mortgages as follows: Start with the cash price, and add to that figure 3 per cent of the estimated first mortgage. Deduct from that total any cash payment made by the customer, and also deduct the amount of the estimated first mortgage. Divide the result by 90, 85 or 80, for a one, two or three-year second mortgage, and multiply that figure by 100, which gives you the amount of the second mortgage. The difference between this last figure and the one which you divided by 90, 85 or 80 added to the cash price, the first mortgage fee, represents the financed price of the house.

Mr. Nichols says he was three months perfecting this system of finance, which is certainly simplicity itself. However, the reader must not lose sight of the fact that the building company is owned and controlled by a real estate firm of the strongest financial standing, so that the contractors, dealers and material men have no hesitation in taking first mortgages on houses not yet built as security for their materials and



House No. 917-9 and living room. See other interior views and plans on page 19





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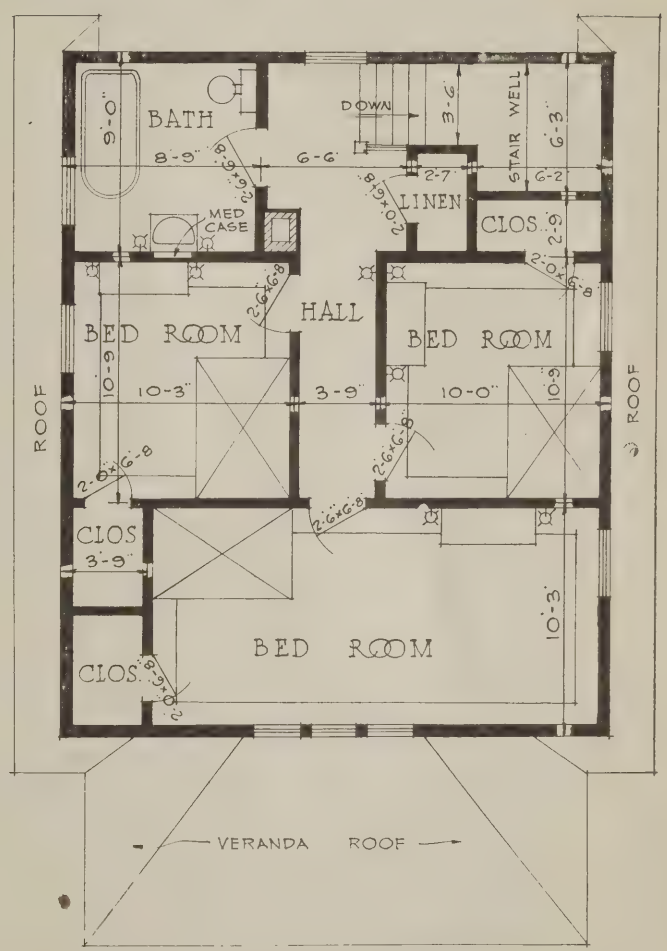

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Interior views and floor plans of House No. 917-9

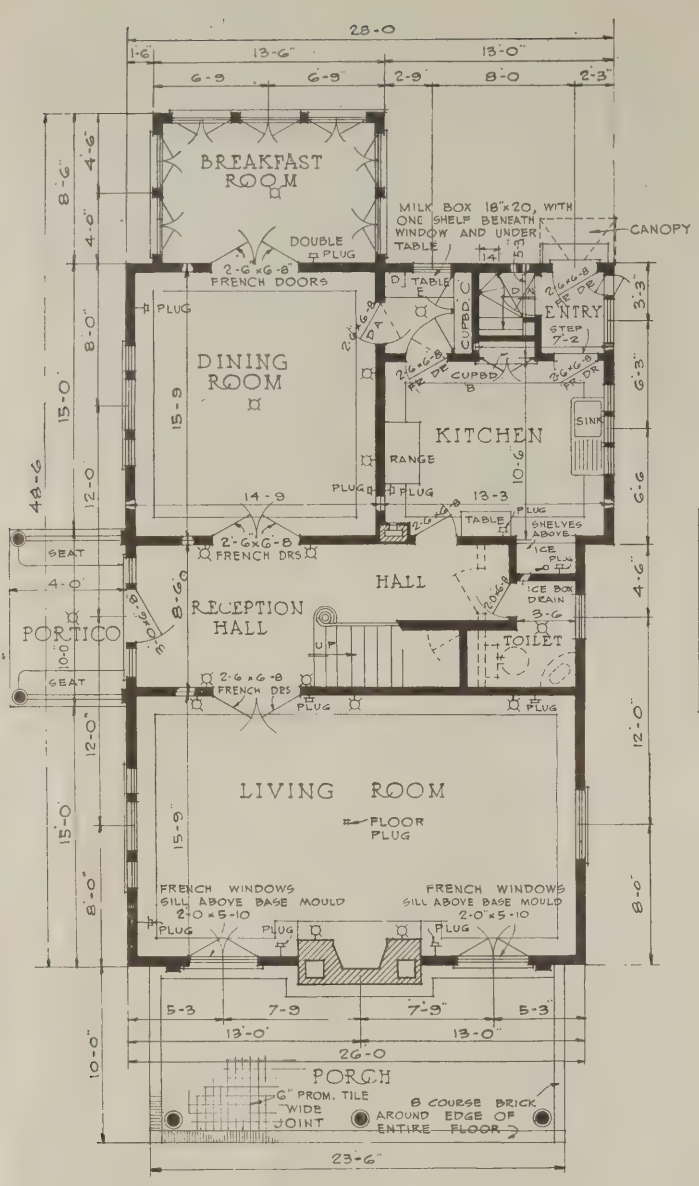
labor. This system does keep the brokerage on the mortgages in the hands of the builders themselves and therefore eliminates the usual big fees of mere mortgage shylocks.

Complete Home Equipment

Buffalo is so near Niagara Falls that electric power is plentiful. Accordingly these houses are usually equipped with the most recent electrical devices, including electric fire-logs in the fireplaces, electric cooking stoves, electric hot-water heaters, and similar devices. Buffalo, also being a cold place in winter, each and every house is completely weather-stripped with an up-to-date copper weather stripping, as well as a furnace.

All these things add sales arguments. Pearce and Pearce have found that most people who have lived in city flats and finally make up their minds to have a home of their own like to see one ready to move into equipped with all the things that go with an "apartment to rent." The weather-stripping was a happy thought, particularly with coal at present prices.

Besides the houses on Lisbon Avenue



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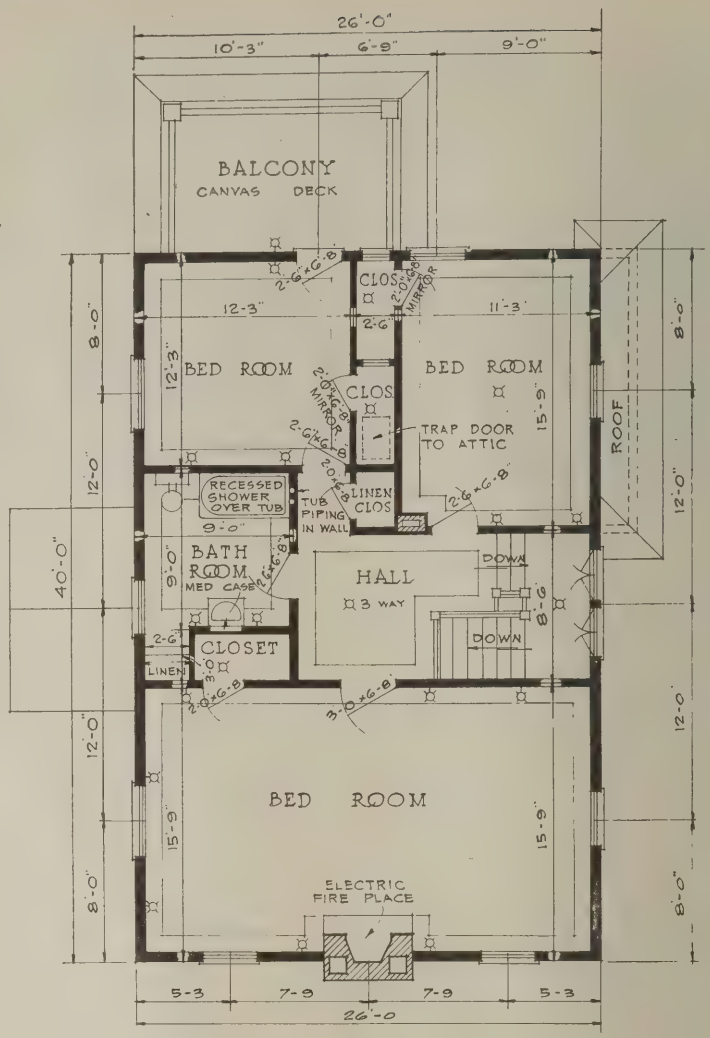

· SECOND · FLOOR · PLAN ·

Floor plans of residence of Dr. Anderson. See photograph reproduction of design on page 33

shown in this article, the Bison City Building Corporation designs and builds houses in all parts of the city, both for Pearce and Pearce and for private parties. One of these houses is illustrated in the "Style Sheet" of this issue. The Lisbon Avenue houses are a popular size and type with salaried workers, but the company does not cater to them exclusively. It builds whole blocks of smaller houses at prices ranging from $5000 to $7500.

Sales Argument

Herewith is a sales argument used by Pearce and Pearce that has been found an excellent antidote for the popular aversion to mortgages:

Many people are giving serious consideration to house buying. Those who have had some experience in purchasing real estate are not at all alarmed over the mortgage bugaboo, but it is a fact that thousands of young men, and many middle-aged ones, too, for that matter, have been deterred from buying a home because, not having the cash to buy free and clear of all liens, they are afraid that a mortgage may involve them in financial ruin. While Buffalo is essentially a city of homes, and less renting is done here than in any of the large cities of the country, it is nevertheless true that the renting class is large, and it may not be wide of the mark to say that a large portion of these tenants have elected to pay a profit to the landlords on their investments rather than to save that profit to themselves by living in their own homes.

This prejudice on the part of citizens owning a home held down by a mortgage has been fostered altogether too much by writers of fiction and authors of melodrama, who have pictured in heart-breaking scenes the selling of the old homestead and the eviction of the family. Thousands of people today have saved enough money to make a first payment on a house, but are scared off by the spectre of the dread mortgage and the horrors of a possible mortgage foreclosure. These people seem to forget that it is no more expensive to own a home than it is to pay rent; that they would be evicted just as easily, and more so, if they did not pay their rent, and that in any event whatever they have paid on their home gives them that much equity in the house.

Few Foreclosures

Now, as a matter of fact, the proportion of foreclosures on real estate to the amount of property under mortgage is so small that it ought to encourage every man who desires to get ahead in the world to buy a home. There are upwards of 100,000 parcels of real estate in the city of Buffalo, and it is a conservative statement to say that at least 75,000 of them, probably more, are under mortgage. The number of foreclosure actions brought in Erie County last year was less than 500, of which about 250 parcels were thus sold, and many of these, perhaps the majority, did not cover residences at all, but business properties and estates which had been mismanaged, and in some cases houses owned by business men who had been unfortunate in their investments of their business ventures. In comparatively few of these cases were the properties sold owned by wage-earners and occupied by them as their homes.

As a rule real estate is not bought free of encumbrances. The average young married couple, if they wished to buy a residence without a mortgage, would probably be obliged to wait until they were long past middle age before they would be able to get a home of their own. Prospective owners of real estate need never concern themselves about the mortgage question so long as they are able to keep up their payments, and the fact that the average term of mortgage is from three to five years need not cause any worry because the duration of a mortgage, especially on properties of the value of $10,000 and less, are merely a matter of form. They are very seldom called in, and even if they are there are always plenty of people waiting to buy first mortgages on small properties, as they are considered a very desirable form of investment.

N. S. Pearce is president of Pearce and Pearce, Inc.; Howard W. Pearce is secretary and treasurer. Both fill the same offices in the Bison City Building Co. As already mentioned C. E. Nichols was until recently vice-president of the building company; A. B. Weaver is the architect, and R. G. Bainbridge the building superintendent.

How Paint Affects Interior Illumination

By Samuel G. Hibben

Illuminating Engineer, The Westinghouse Companies

VERY few people are fully aware of the surprising influence that colors, densities and surface finishes of paint may have upon both the quality and amount of artificial or even natural indoor illumination. In fact, it has been only within the past year or two that careful study has been undertaken along this line, and we can fully expect that architects and engineers will continue to take more and more interest in the subject, as we gain in knowledge of eye comfort, economics of night lighting, and costs of maintenance of lighting systems and interior surfaces.

A few months ago an engineer made up two gray shades, using different tinting colors in producing them. Then the two grays were coated upon wood and metal, and samples when dried tested for their light reflecting properties. Even though the color match was perfect, yet one of the paints invariably absorbed more light than did the other. The obvious conclusion was that most all ingredients in paint have a decided influence upon their efficiency as light reflectors, and that colors or tints alone are not the sole criteria of illuminating efficiency.

Further studies have been made that lead to other interesting and valuable conclusions, but in order to better understand the inter-action of light and interior surface coatings, the following points should be kept in mind.

Light, such as from an electric lamp, penetrates further into some surface films than in others. If light reflects from a dense surface, or as it would do from a highly glazed paint, it would naturally remain unchanged in color. This action may be seen by reflecting a ray of white light from a sheet of red glass, and observing that the reflected ray still remains uncolored, *i. e.*, white. But if the light penetrates somewhat into the surface, it will be redirected back with a change in color, just as the ray of white light which passes through the sheet of red glass will emerge red. The ordinary mixture of ochre and oil applied to a tin roof will illustrate this coloring action of the painted surface upon light, because here the diffusely reflected light of the sun will be decidedly pink.

The commercial application of this fact is full of possibilities. If a merchant desired to secure artificial illumination in a store which would approach or approximate daylight in color-quality, he might use the daylight blue Mazda lamps in the lighting units, but might absolutely counteract the color correcting action of the blue glass of the lamps or the enclosing globes by using a yellow or red shade of interior paint. Conversely, in a residence room, most people, particularly the feminine folk, prefer a warm cozy atmosphere, and the original white light of either day or night illuminants can be made slightly golden or less harsh and cold by carefully selected ceiling and wall colors of rich cream, old ivory, or tan.

No good paint salesman would allow a jeweler to use gray or green colors in a room where pearls were sold; neither would he recommend yellow or red walls to surround displays of cut-glass, silverware or diamonds. If an office in a modern city skyscraper had a northern or north sky exposure, it usually should be finished in cream rather than gray or greenish colors. If rooms face the south, and have a large amount of direct sunlight, the dictates of eye-comfort say use the light grayish-green colors on walls.

Some of the greatest mistakes in painting are those which arise through a misunderstanding of the laws of light reflection. One very favorite and wrongly used expression, when speaking of reflected light, is that "the angle of reflection equals the angle of incidence." Everyone should carefully note that this law holds true for only the surfaces, like mirrors, polished metal, or modified conditions, like a highly polished and varnished surface. The actual fact is that when light is reflected from a matt, stippled or depolished surface it will be spread out much, and the majority of it will be redirected back normal or perpendicular to the painted surface regardless of the direction from which it originally came. For this reason it is of no benefit to have glossy finishes of painted surfaces; in fact, the amount of light reflected therefrom is usually no greater than that reflected from a matt surface, and shiny surface finishes create bright images of light sources, hence augment glare.

Paint colors have a tremendous effect upon the quantity of usable illumination. In smaller rooms this effect is so great that one may well emphasize it repeatedly.

Suppose we have two small rooms, one finished in a dirty yellow color that has a reflecting value or coefficient of 70 per cent; the other finished in medium cream color with a coefficient of 80 per cent. The direct light on the table in the first room would be increased (by virtue of multiple interior reflections) by 3.3. The increase in the second room would be 5.0. If a 150 watt Mazda lamp furnished sufficient illumination in the first room, then a 100 watt lamp would furnish about the same illumination in the second.

The cost of painting with a good cream color would be no greater than applying the darker yellow, yet in the darker interior the cost for lighting power to produce the same illumination would be 50 per cent greater.

It will at once occur to any thoughtful person that it may pay to refinish a dingy or dirty interior, because thereby the useful illumination can be so greatly increased, or the lighting costs so greatly reduced. Savings in electric power usually can more than offset costs for painting.

Painting for light is a very vital subject. The proper cleaning of painted surfaces is likewise important, but that will be sufficiently interesting in itself to form another article of this series.—*Paton's Monthly.*

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A FIVE-ROOM HOUSE OF HOLLOW TILE AND STUCCO. SEE DESCRIPTION AND PLANS ON FOLLOWING PAGES

Five-Room House of Hollow Tile and Stucco

House No. 5A50 Designed for National Builder by The Architects' Small House Service Bureau of the U. S.

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AMONG the new homes now being built in all sections of the country there is plenty of evidence that the refinement and individual effect of the Italian style is popular with the small home builder.

This design is an Italian adaptation to a modern five-room two-story house. The construction is of hollow tile with exterior stucco walls and interior wood finish, shingle roof, and brick base course. The windows have been given an interesting treatment in their brick sills. The first floor windows in front have wood panels below and recessed arches in the Italian style above with tile inserts relieving the stucco with spots of color. The iron rail above the door and the wrought iron lamp enhance the Italian effect.

This is an especially good plan, as it gets five good rooms into a limited space. There is no space that is not room space. There are practically no hallways wasting room. The plan belongs to the popular center stairway type. The living room runs from front to back on one side with light and air from three sides, while the dining room and kitchen divide the other half of the first floor.

Features of this plan are the large open porch and the spacious living room with its attractive fireplace. The porch, 12 ft. by 8 ft., can be screened or glazed. The living room opens on the porch by a single French door.

The porch can also be built at the side if desired. Then a wider lot will be required. Otherwise this design will go very well on a 40-ft. lot.

The kitchen has been carefully designed to provide a convenient work room for the housewife. The sink is under a window on the outside wall. There are plenty of cupboards, a broom closet in the outside entry, and a place in the entry for the ice box.

On the second floor there are two comfortable bedrooms and bath. There are large closets for each bedroom and a linen closet in the second story hallway. The plan provides attic space and a full basement.

The house is designed to face north or west, but can be reversed for other facings.

The regular price of these plans is $25. Reversed plans are furnished without extra charge. The working plans are shown in reduced form herewith. By special arrangement NATIONAL BUILDER readers can obtain full sized blue prints at half price.

Specifications and Quantity Survey

EXCAVATING: 150 cu. yds.

BACKFILLING: 30 cu. yds.

FOUNDATIONS:

If 12″ concrete, 43 cu. yd. gravel, 174 sax cement
If 9″ concrete, 36 cu. yd. gravel, 146 sax cement
If 12″ tile, 20,000 CBM tile, 15 cu. yds. mortar
If 9″ tile, 16,000 CBM tile, 12 cu. yds. mortar
1624 face brick for porch steps and walls and sills

CEMENT FLOOR:

4 cu. yds. gravel
3 cu. yds. sand
44 sax cement
5 spatter tile

CHIMNEY:

1600 common brick
300 face brick
56 lin. ft. 8x12 flue tile
2 cu. yds. mortar
5 sq. yds. metal lath
8 8x12 clean outs
3 6″ adjustable thimbles
16 sq. ft. hearth tile
100 fire brick
20 pounds fire clay
1 cast iron ash dump
1 throat and damper
1 4x3x¼″ angle
200 inside face brick
20 lbs. mortar color

TILE FOR EXTERIOR WALLS:

25,300 CBM tile
18 cu. yds mortar

LATH: 7¾M lath

PLASTER:

543 sy. yds. walls and ceilings
14 sq. yds. Keene's cement
220 sq. yds. stucco on tile
8 sq. yds. ceiling over boiler on metal

TILE FLOOR:

30 sq. ft. ceramic tile
27 lin. ft. cove base

LUMBER:

4—6x6-8 posts
2—6x10-20 girders
8—2x4-20 girders ribbons and plates
4—2x4-12 stair stringers
100 lin. ft. 2x6 plates
2—2x6-6 headers, 1st floor
7—2x6-7 joists, 1st floor
16—2x10-12 joists, 1st floor
10—2x10-14 joists, 1st floor
16—2x10-14 joists, 1st floor
160 lin. ft. 1x4 bridging
3—2x4-18 plates
13—2x4-8 basement studs
180 ft. 6″ D&M basement sheating
6—2x6-3 porch joists
11—2x6-8 porch joists
1—2x6-20 porch joists
4 ft. 2″ plank cleanout cover
660 ft. com. bds. 1st floor sub floor
810 ft. 13/x1 1/2 1st floor finish floor
150 ft. 4″ edge grain porch flooring
2—2x8-12 porch girders
4—2x8-8 porch girders
10—2x4-8 porch ceiling joists
140 ft ⅝x4 porch ceiling
192 lin. ft. 2x4 1st floor partition plates
58—2x4-9 1st floor partition studs
2—2x10-5 opening headers
4—2x10-14 doubles, 1st floor joist
16—2x10-14 2nd floor joist
16—2x10-20 2nd floor joist
4—2x10-12 headers
6—2x4-16 stair horses
660 ft. com. bds. 2nd floor subfloor
780 ft. 13/16x1 1/2 2nd floor finish floor
300 ft. No. bds. grounds
204 lin. ft. 2x4—2nd floor partition plates
60—2x4-8 2nd floor partition studs
16—2x10-12 2nd floor ceiling joists
16—2x6-20 2nd floor ceiling joists
760 ft. 6″ D&M attic floor
50—2x4-14 rafters
10—2x4-10 rafters
32 lin ft. 1x8 ribbon rafters
2—2x6-14 headers
4—2x4-16 headers
50 ft. shiplap wall sheating
76 ft. ½x6 lap siding
1300 ft. 6″ D&M roof sheating
8½M shingles
4—2x4-16 gable studs on porch
1—2x12-8 step horses
20—2x4-5 collar ties
25—2x4-16 scaffold
4—2x6-20 scaffold
5—2x8-16 scaffold

MILLWORK—Frames:

3 cellar frames 8x10-3L-1⅜
1 mul. cellar fr. 8x10-3L-1⅜
2 ck. rl. frames 10x14-16L-1⅜
3 ck. rl. frames 10x14-12L-1⅜
8 ck. rl. frames 9x10-12L-1⅜
1 ck. rl. frames 10x16-16L-1⅜
1 mul. casement fr. 8x12-4L-1⅜
2 Louvre frames

Windows:

5 sash 8x10-3L-1⅜
2 windows 10x14-16L-1⅜
3 windows 10x14-12L-1⅜
8 windows 9x10-12L-1⅜
1 window 10x16-16L-1⅜
2 casements 8x12-4L-1⅜

Storm Sash:

5 st. sh. 8x10- 3L-1⅜
2 st. sh. 10x14-16L-1⅜
3 st. sh. 10x14-12L-1⅜
8 st. sh. 9x10-12L-1⅜
1 st. sh. 10x16-16L-1⅜
2 st. sh. 8x12- 4L-1⅜

Screens:

5 screens 8x10- 3L-1⅜
2 screens 10x14-16L-1⅜
3 screens 10x14-12L-1⅜
8 screens 9x10-12L-1⅜
1 screen 10x16-16L-1⅜
2 screens 8x12- 4L-1⅜

Shutters:

3 pr. shutters for windows 10x14-12L-1⅜
5 pr. shutters for windows 9x10-12L-1⅜
1 pr. shutters for windows 10x16- 6L-1⅜
2 single shutters for casements 8x12-4L-1⅜

Outside Door Frames:

1 door frame 2′8x7′0-1¾
2 door frame 3′0x7′0-1¾

Outside Doors:

1 door 2′8x7′0-1¾ No. 753
1 door 3′0x7′0-1¾ No. 1246
1 door 3′0x7′0-1¾ No. 1605

Storm Doors:

1 storm door 2′8x7′0-1⅜
2 storm door 3′0x7′0-1⅜

Screen Doors:
1 screen door 2'8x7'0-1⅜
2 screen door 3'0x7'0-1⅜
Outside Millwork:

1 set porch steps
33 lin. ft. porch cornice
6 porch columns
2½ porch columns
30 lin. ft. porch soffit
30 lin. ft. porch outside facia
30 lin. ft. porch inside facia
38 lin. ft. porch base
40 lin. ft. porch cove
124 lin. ft. main cornice
2 wood panels

Interior Doors:

1 door 2'6x6'8-1⅜ No. 720
1 door 2'0x6'8-1⅜ No. 1102
2 door 2'6x7'0-1⅜ No. 1102
1 door 2'0x7'0-1⅜ No. 1102
2 door 2'6x6'8-1⅜ No. 1102
5 door 2'4x6'8-1⅜ No. 1102

Jambs:

1 jamb 2'6x6'8
1 jamb 2'0x6'8
2 jamb 2'6x7'0
1 jamb 2'0x7'0
2 jamb 2'6x6'8
5 jamb 2'4x6'8
2 jamb 2'6x7'0

Interior Trim:

3 sides trim 8x10-3L
1 side mul. trim 8x10-3L
2 side wd. trim 10x14-16L
3 side wd. trim 10x14-12L
8 side wd. trim 9x10-12L
1 side wd. trim 10x16-16L
1 side mul. casement trim 8x12-4L
1 side dr. trim 2'8x7'0
2 side dr. trim 3'0x7'0
2 side dr. trim 2'6x6'8
2 side dr. trim 2'0x6'8
4 side dr. trim 2'6x7'0
2 side dr. trim 2'0x7'0
4 side dr. trim 2'6x6'8
10 side dr. trim 2'4x6'8
4 side dr. trim 3'6x7'0
1 flight basement stairs
1 flight main stairs
1 flight attic stairs
1 medicine cabinet No. 2835
1 towel cabinet
1 utility door, jamb and trim
1 mantle shelf
1 meter cabinet
2 3'6 cupboards
1 work table
1 drop table
1 drain board

Interior Millwork:

14 lin. ft. closet shelving
12 lin. ft. closet rod
16 lin. ft. closet hook strip
24 lin. ft. band moulding
460 lin. ft. base
460 lin. ft. base moulding
460 lin. ft. base shoe
15 lin. ft. corner bead
200 lin. ft. picture moulding
70 lin. ft. ceiling cove
10 lin. ft. threshold

TILE INSERTS:

8 tile inserts

ORNAMENTAL IRON:

10 lin. ft. ornamental rail
1 lantern

REINFORCED STEEL:

12-⅜ rods 10'

STRUCTURAL STEEL:

180 lin. ft. 3x3x¼ angles

HARDWARE:

5 cellar sash sets
14 sash locks
14 sash lifts
2 casement sash sets
21 storm sash sets
21 screen sets
9 shutter sash sets for pairs
2 shutter sash sets for singles
3 outside door sets with butts
3 storm door sets
3 screen door sets
11 inside door sets with butts
1 floor hinge
2 push plates
15 door bumpers
360 lbs. sash weights
1100 lbs. assorted nails
3 hanks sash cord
1 coal chute
6 lbs. assorted brads

6 stair rail brackets
1 drain board bracket
1 pair ornamental butts, 1 cupboard turn } medicine cabinet
1 pair ornamental butts, 1 cupboard turn } towel cabinet
4 friction stays, utility cabinet
1 pair ornamental butts, 1 cupboard turn } meter cabinet
1 set drop leaf hinged brackets
4 pair ornamental butts, 2 cupboard turns, 2 blind catches, 3 drawer pulls, 1 set castors, 1 bin pull } work table
6 pair ornamental butts, 3 cupboard turns, 3 blind catches } kitchen cabinet
3 dozen clothes hooks
1 drawer pull for drawer in drain board

TIN WORK

32 lin. ft. ridge roll
2 finials
4 sheets sheet tin
20 lin. ft. flashing tin
78 lin. ft. gutter
26 gutter hangers
6 gutter ends
5 nipples
5 strainers
5 offsets
5 elbows
5 shut-offs
84 lin. ft. conductors
20 conductor hooks
150 tin shingles
2—8x8 screened vents

INSULATION

640 ft. second floor ceiling
3 rolls red rosin floor
3 rolls tar felt roof

CAULKING

3 door openings
21 window openings
1 coal chute

WEATHER STRIPPING

3 door openings
14 check rail windows
2 casement sash

EXTERIOR PAINTING

27 gal. shingle stain
4 gal. trim paint
1 gal. oil
1 gal. turpentine
½ gal. orange shellac
½ gal. porch floor paint
½ gal. sash color
½ gal. screen paint
2 lbs. putty
½ gal. shutter paint

INTERIOR PAINT

12 gal. white paint
11 gal. enamel
3 gal. shellac
13 gal. interior varnish
5 gal. shellac for floors
7 gal. floor varnish
2 gal. boiled oil
½ gal. alcohol
1 gal. benzine
5 lbs. putty
2 doz. sheets sandpaper
2 lbs. steel wool

PLUMBING

1 two part laundry tray
1 floor drain
1 sink
1 lavatory
1 toilet
1 sewer and water connection
vents for all fixtures
1 hot water tank with coil for furnace
1 ice box drain—2 sill cocks

HEATING

1 hot air plant, 12,000 ft. capacity with 7 base registers

WIRING:

1 power outlet, 3 light outlets, 1 three way switch } basement
1 outside light outlet
12 light outlets
10 switch outlets
7 base outlets
2 push button outlets
1 bell outlet
1 buzzer outlet
1 gas connection

MATERIALS		ELECTRIC WIRING SYMBOLS			
CONCRETE		CEILING OUTLET		3 WAY SWITCH	
BRICK		DROP CORD		GAS OUTLET	
WOOD		BRACKET		PUSH BUTTON	
PLASTER		BASE PLUG		BELL OUTLET	
TILE		SWITCH		BUZZER	

Dimensions are taken to outside of foundation walls, to outside of studs on exterior walls and center of studs for partitions.

Foundation walls shown concrete may be stone, brick, concrete block or load bearing hollow tile.

Where building ordinances permit, foundation walls may be 9 in. thick (with 20x9-in. footings) except in case of stone which shall be 18 in. thick.

Stock numbers refer to mouldings in Universal Millwork Design Book No. 20. In case these mouldings can not be procured, others of similar design and size may be substituted.

Provide 1⅜-in. screen and storm sash for all exterior openings except ice door unless otherwise noted. Bottom rail of storm sash to have vent.

All closets to have shelf, hook strips and hanger rods.

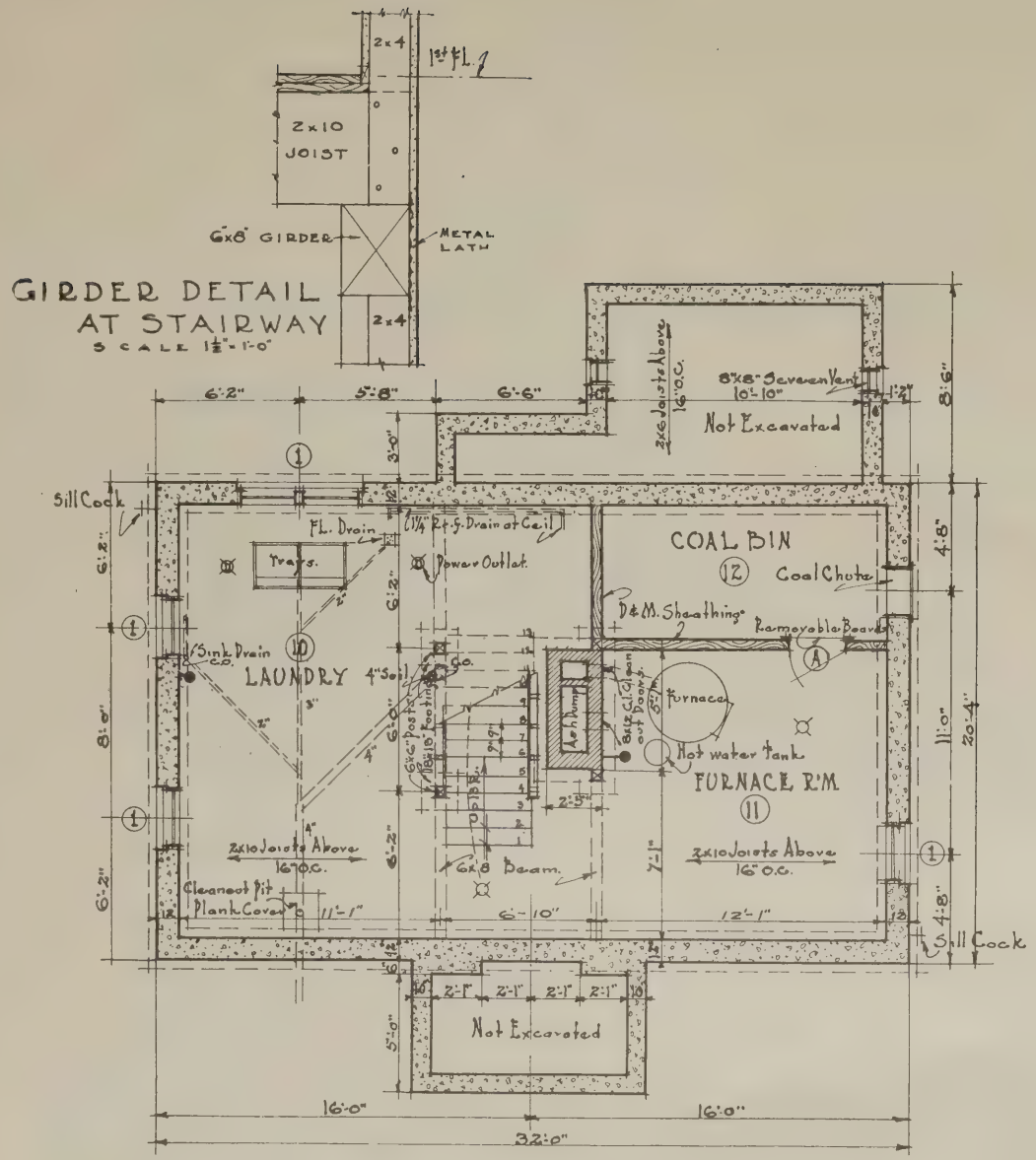
Five Hundred and Twenty-Five Dollars in Prizes are offered for the best stories of how these plans are used. See announcement on page 60.

Five Millions a Year Cement Sack Losses

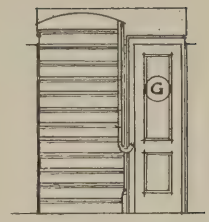
THE cement industry of the United States at present has an investment of approximately $30,000,000 in cotton sacks either on hand or in use, totals 200,000,000, according to the Portland Cement Association.

The report shows that practically 90 per cent of the 110,000,000 barrels of portland cement shipped in 1922 was delivered in returnable cotton sacks. There are four sacks to a barrel, each sack contains 94 pounds, or a cubic foot.

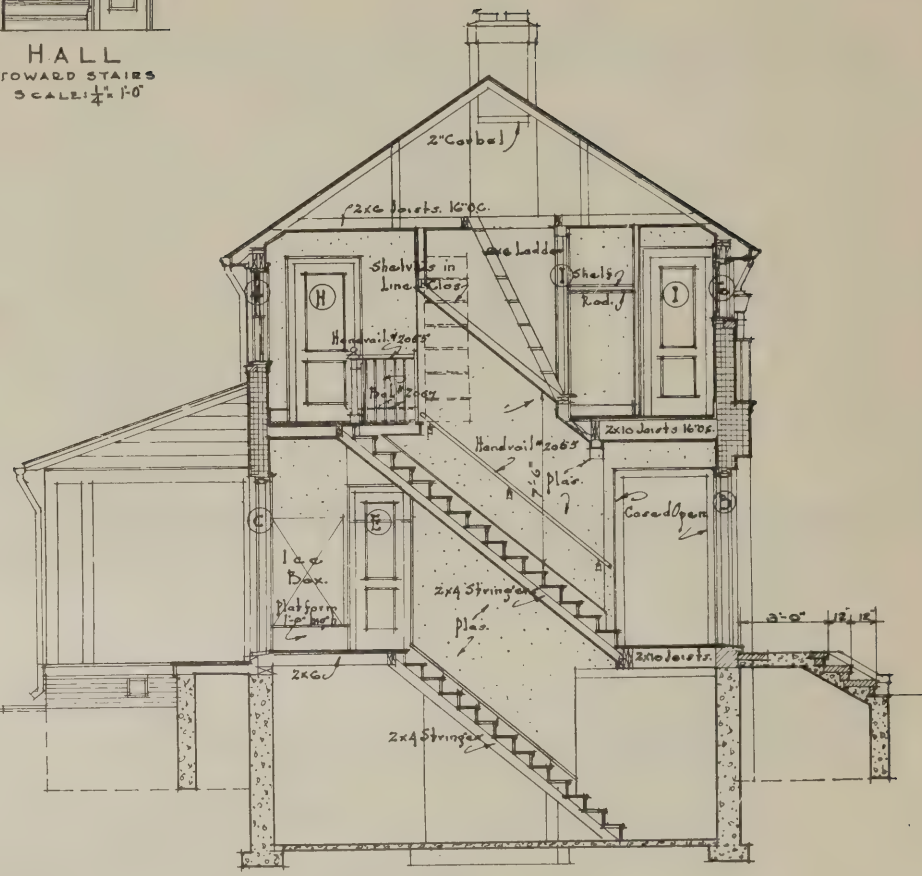
When cement is shipped, the sacks are billed to the purchaser. When they are returned, they are bought back at the same price if they are in usable or repairable condition. This involves much work in checking, cleaning, sorting and repairing. But in spite of the fact that every good cement sack is redeemable, 30,000,000 of the sacks shipped every year fail to come back—a loss of nearly $5,000,000 a year at present prices of new sacks.



BASEMENT PLAN
Scale ¼"=1'-0"



HALL
TOWARD STAIRS
SCALE: ¼"=1'-0"



SECTION
Scale ¼"=1'-0"

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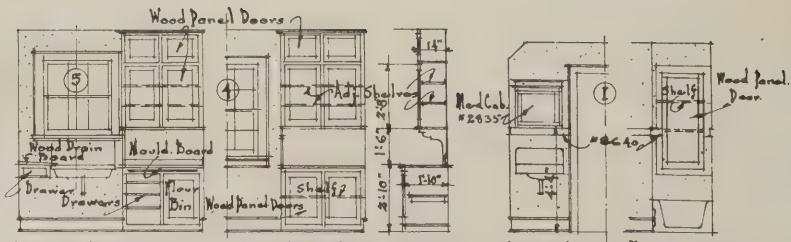
SCHEDULE OF WINDOWS

QUANTITY	TYPE	DESCRIPTION	No OF LIGHTS	SIZE GLASS	SIZE OF OPNG FOR SASH	THICKNESS SASH	FRAME
5	1	Basement	3	8 X 10	2'-4" x 1'-3"	1 3/8"	See Detail
2	2	Double Hung	16	10X14	3'-8¾" x 5'-2"	"	"
3	3	" "	12	10X14	2'-10½" x 5'-2"	"	"
8	4	" "	12	9X10	2'-7½" x 3'-10	"	"
1	5	" "	6	10 X 16	2'-10½" x 3'-2	"	"
2	6	Casement	4	8 X 12	1'-8" x 2'-5"	"	"

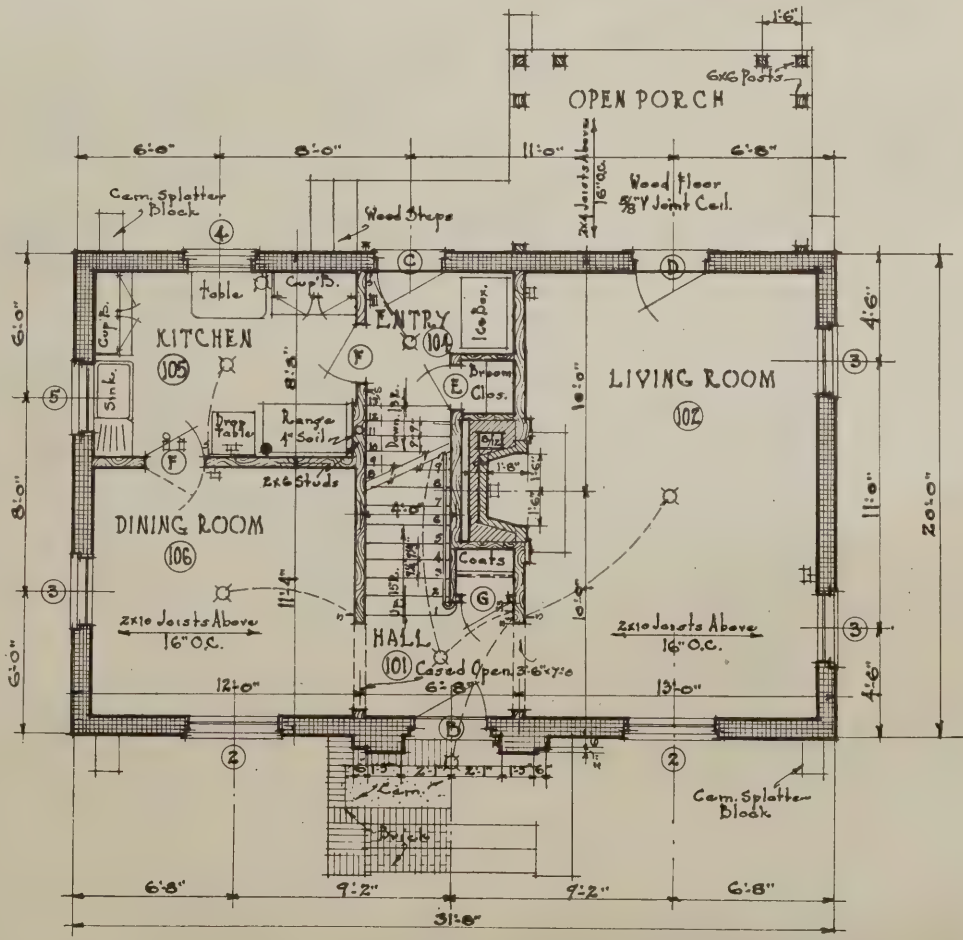
Note.
All openings in masonry walls to have 2-3x3x¼" L's for lintels

SCHEDULE OF DOORS

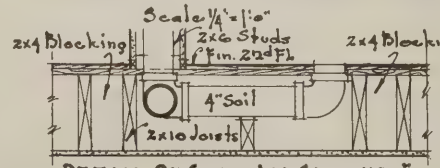
QUANTITY	TYPE	SIZE	DESCRIPTION	REMARKS
1	A	2'-6"x6'-8" x 1 3/8"	UNIV. # 720	5 panel
1	B	3'-0"x7'-0" x 1¾"	" #1246	Glazed With D.S.
1	C	2'-8"x7'-0" x 1¾"	" #753	REAR.
1	D	3'-0"x7'-0" x 1¾"	" #1605	PORCH
1	E	2'-0"x6'-8"x1 3/8	" #1102	INTERIOR.
2	F	2'-6" x 7'-0" x 1 3/8	" "	"
1	G	2'-0" x 7'-0" x 1 3/8	" "	"
2	H	2'-6" x 6'-8" x 1 3/8	" "	"
5	I	2'-4" x 6'-8" x 1 3/8	" "	"



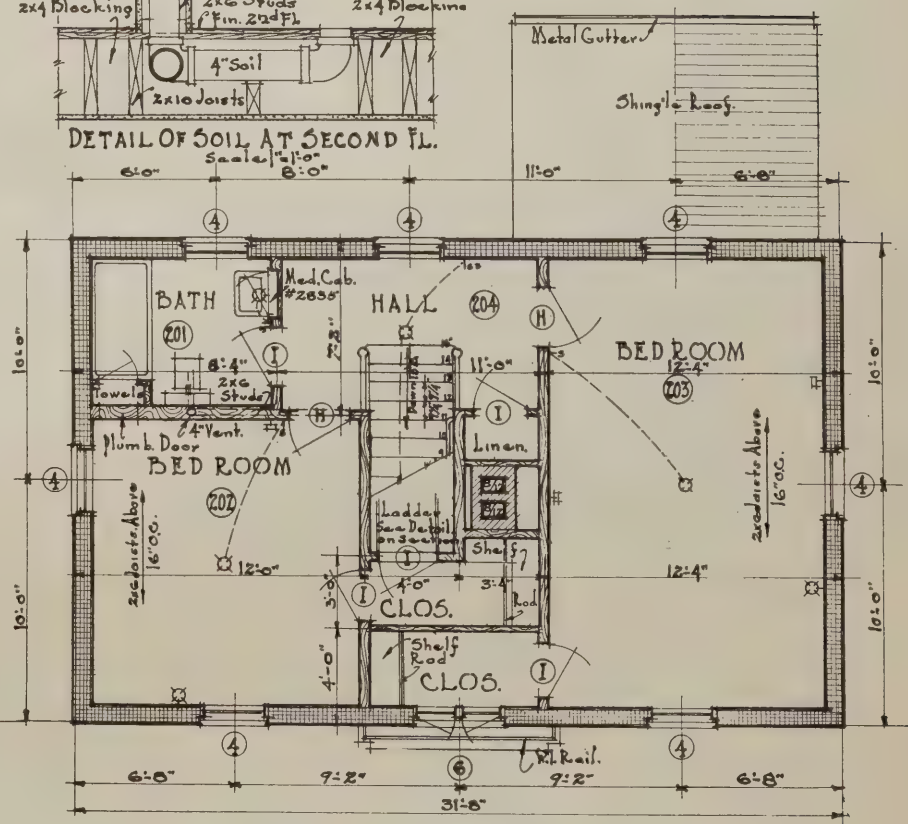
KITCHEN TOWARD SINK. KITCHEN TOWARD REAR. SECTION. BATH ROOM ELEVATIONS.



FIRST FLOOR PLAN
Scale ¼"=1'-0"



DETAIL OF SOIL AT SECOND FL.



SECOND FLOOR PLAN.
Scale ¼"=1'-0"

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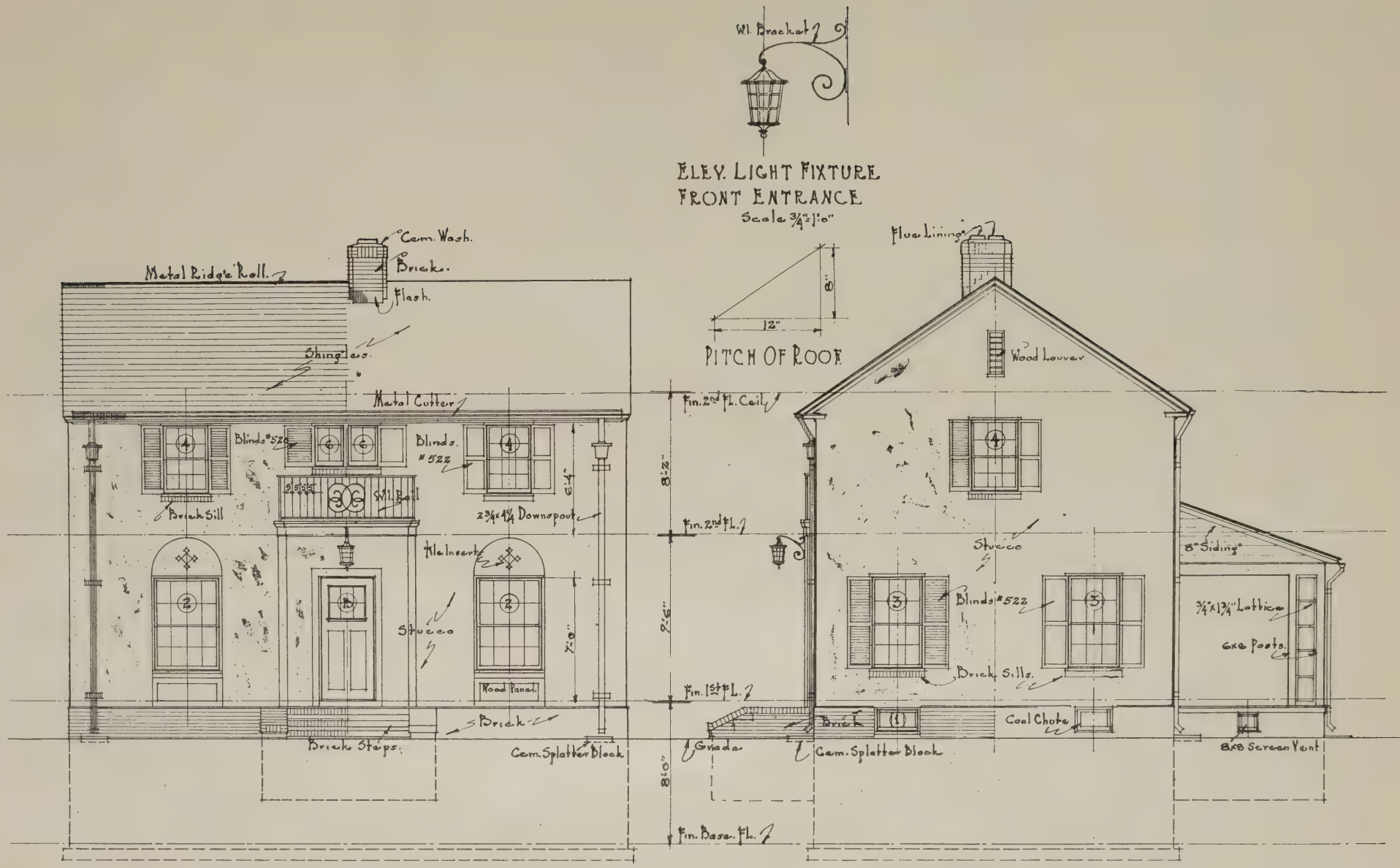

FRONT ELEVATION Scale 1/4"=1'-0" SIDE ELEVATION

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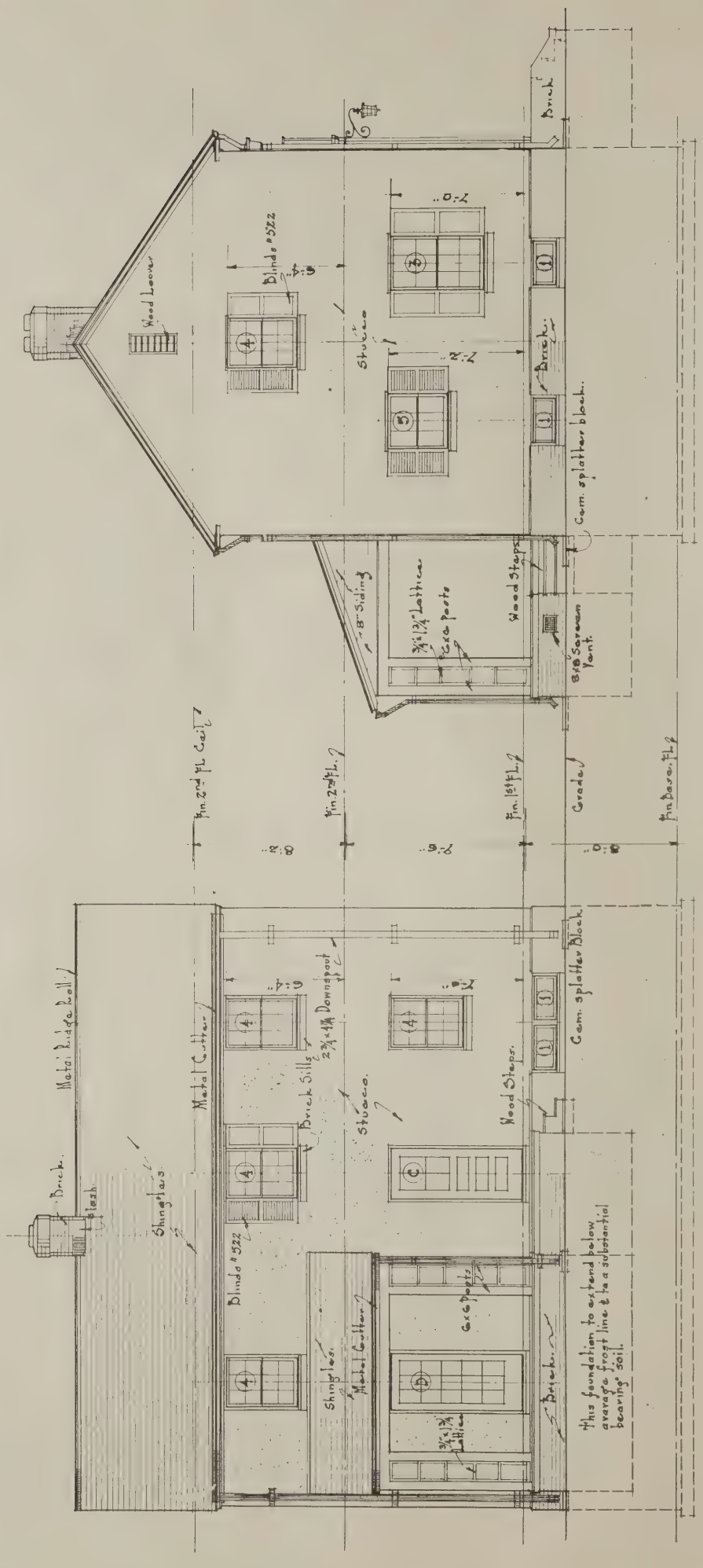

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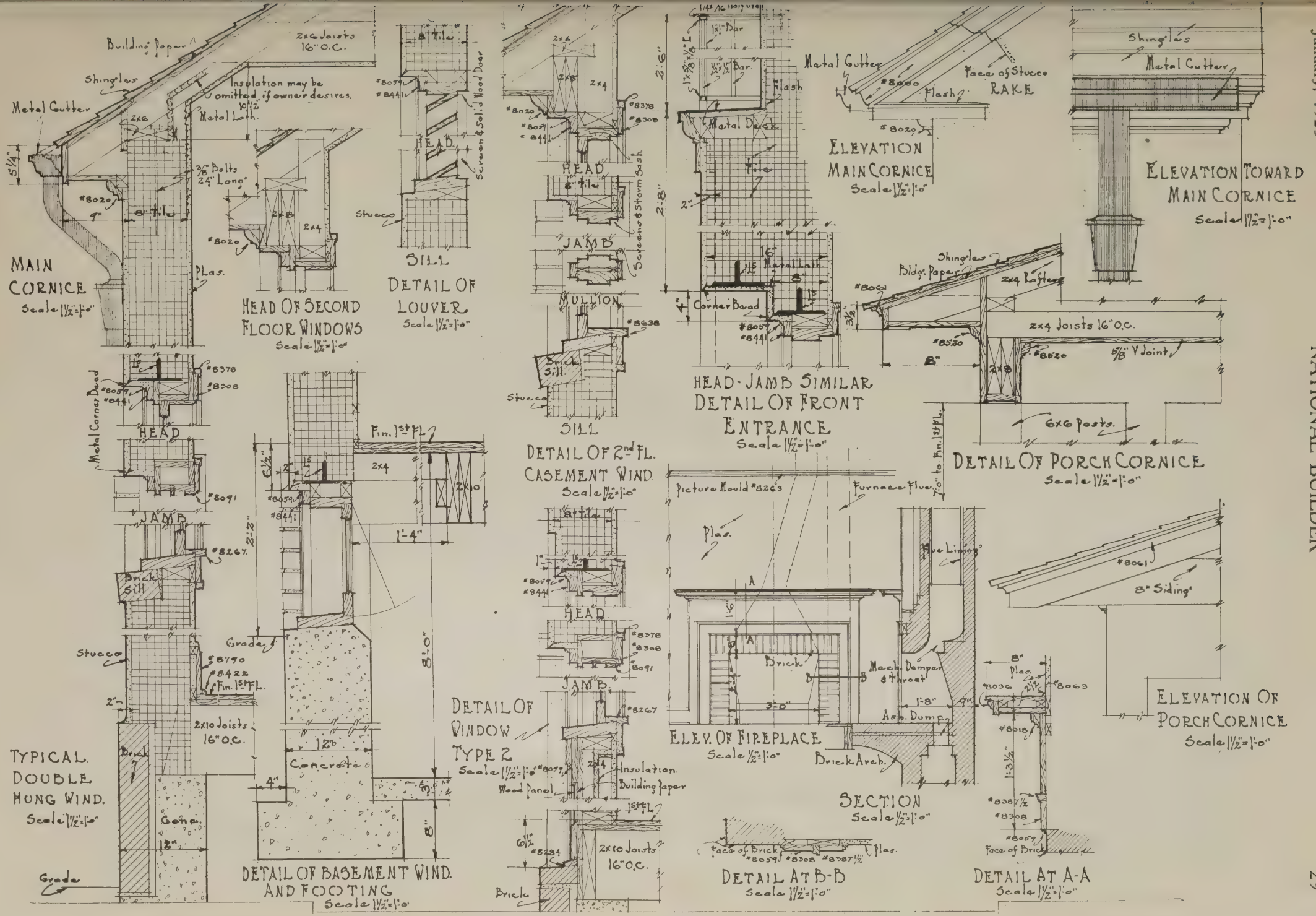

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The Square Foot as a Pricing Unit

Continued from the November Issue as Part II of the Third of a Series of Articles on Short Cuts in Rapid Estimating and Methods Employed for Approximating the Cost of Buildings. The First Article Appeared in the July Number of National Builder, the Second Article in the September Number

By Theodore F. Laist

IF we chart the figures shown in column 7 of the table on page 49 of the November issue we notice the variations are expressed by a curve and not a straight line, indicating that the variations are not uniform. Ordinarily, it is not necessary to obtain more than three points on a curve which in fact requires the figuring of three buildings of each type and width. A short cut method of doing this was described in detail in the article in the September issue by using surface measurements or whole wall and floor sections as pricing units; that is, prices are obtained for a square (100 sq. ft.) of completed exterior or interior wall, and for a square of roof construction or floor. These figures are added to the cost of the basic house and thus the new total is obtained.

Practical Example

It is assumed that all the examples are of the same general type of construction and that the finish, story heights, etc., are practically the same.

First Step

Refer to Plates I and II on which are grouped plans of bungalows similar in type and construction but varying in size. Close observation will reveal that, while the partition arrangement varies greatly, the number of rooms, openings, and the length of walls, etc., display a certain uniformity. In some instances there are porches, both front and rear, bay windows, etc. These differences must be considered in the final adjustment.

Refer now to the chart upon which is shown the basic bungalow plan in black. The extensions are shown in cross-hatching. These lines show what happens when the bungalow is expanded in two different directions as indicated by the square in the upper right-hand corner. If we assume a basic price for a structure and a price for each foot of extension in either direction, say $61 for length and $81 for width, and assume that the structure is extended 5 ft. in each direction, 5x61 or $305, plus 5x81 or $405, does not give the total cost of the extension as the 5x5 ft. section of floor construction in the corner has been left out, and must be added.

In making a calculation for various sizes, the first step is to determine the cost of the walls, floors, etc., completed so that the cost of such sections may be added or deducted for changes from the basic structure.

Below is a chart which shows the square-foot price of bungalows adjusted to various lengths and widths. Lines are drawn for widths of 26 ft., 31 ft., 36 ft., 41 ft., etc.

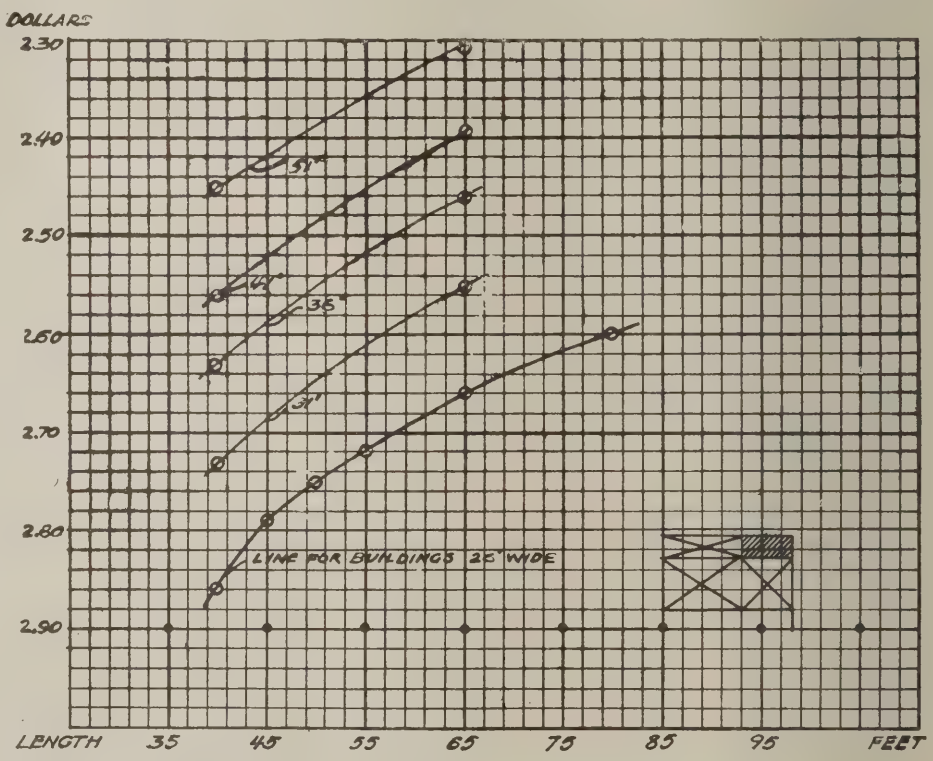


Chart from which may be read the cost per square foot of any one-story bungalow similar to the basic structure. Example: 26 x 59 ft.; on the line marked "Length" find 59, the second vertical line to the right of the vertical line marked 55. Follow this up until it intersects the line marked "For buildings 26 ft. wide." Trace the intersecting point to the left until it intersects the price line. The result lies between $2.69 and $2.70

To obtain a width between, an additional curve may be drawn between those shown. It will be noticed that the curves are not parallel. The square-foot price gives the price of the building stripped of all the constants and extras.

The question arises, why use a chart when the same result may be obtained by adding the additional wall, floor and roof surfaces to the cost of the basic structure? This, of course, may be done, but involves more work and requires additional calculations for variations in price. If it is desired in the case of curves to make any adjustments in price this may readily be done by somewhat changing the scale on the left.

The curves which show the fluctuations between the sizes are practically the same in all cases.

Adjustments

Just as estimating by bill of material is not a purely mechanical process so this system must not be regarded as such. Every plan differs slightly from another and an allowance for each substantial difference must be added in a lump sum. For example

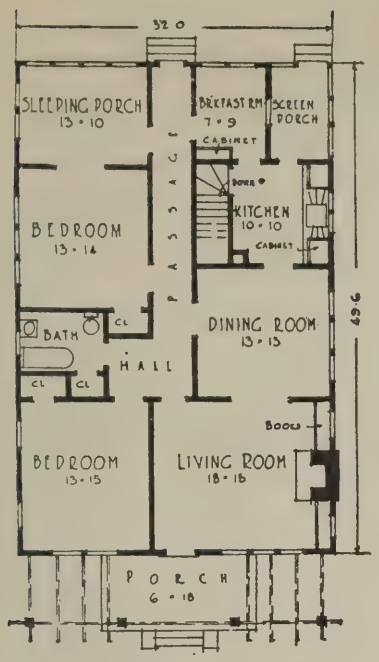


Fig. I

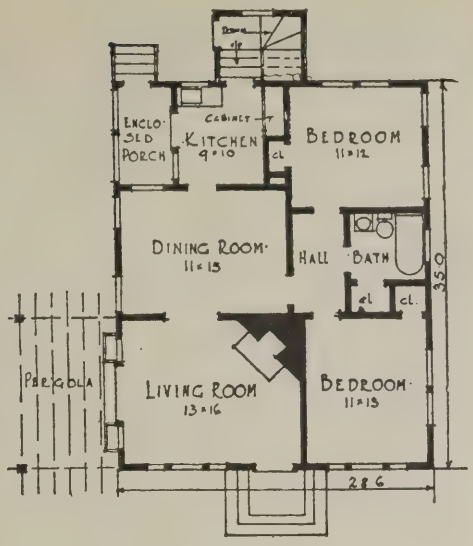


Fig. II

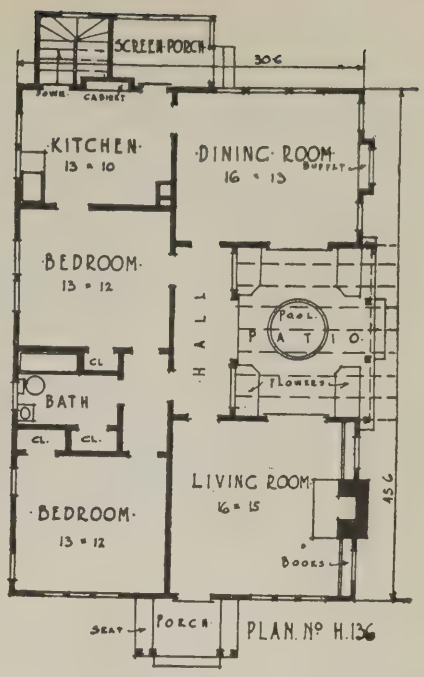


Fig. III

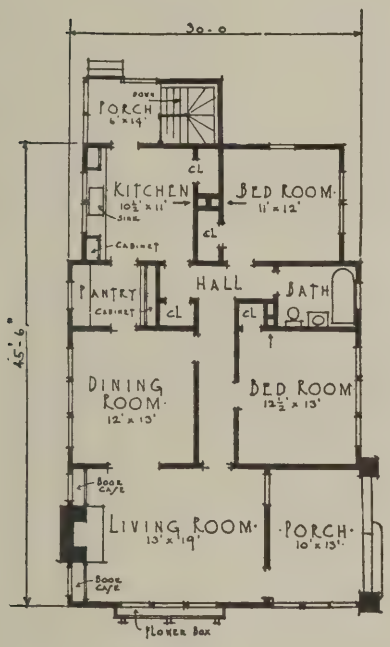


Fig. IV

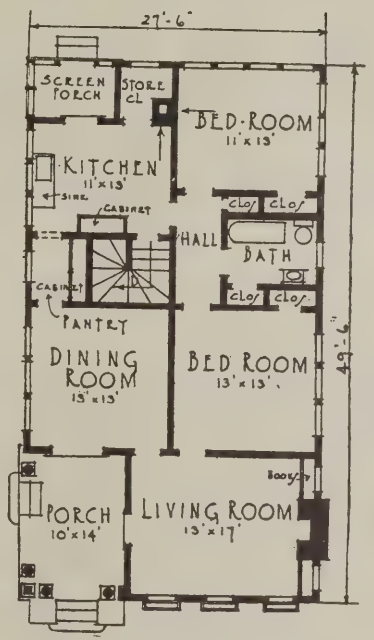


Fig. V

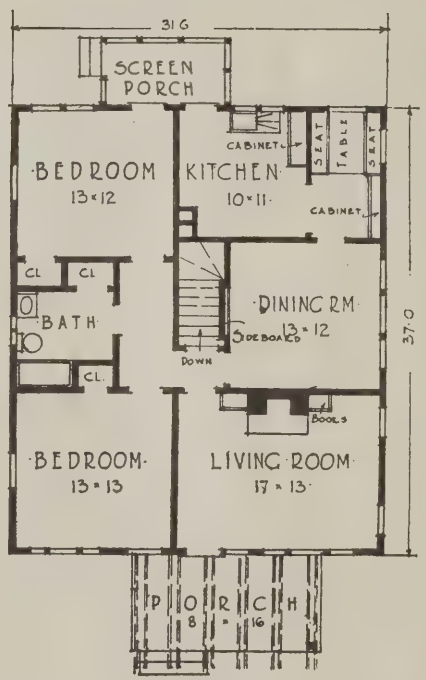


Fig. VI

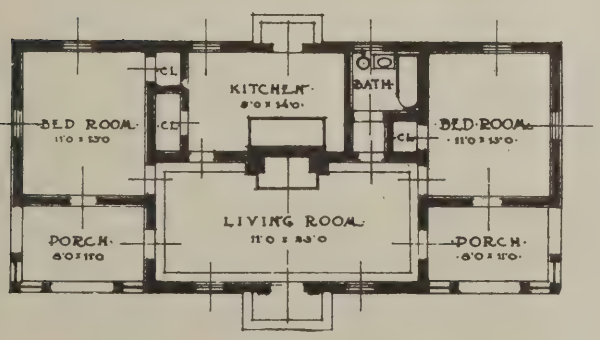


Fig. VII

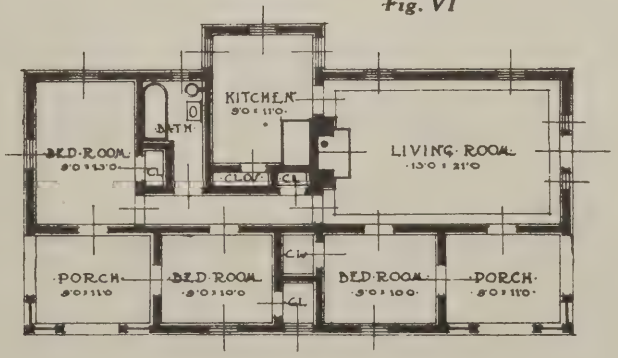


Fig VIII

Plate I

after obtaining the price per square foot from the curve and getting the total, in case of a building of more elaborate finish, a percentage should be added, also an extra, perhaps for an additional porch, etc. In short the cost of the structure to be figured should be weighed as against the cost of the basic structure, as the chart assumes, in every particular, that in the extended structure the parts increase in the same proportion as the length and width which, of course, is not always the case.

Where a structure is extended beyond 10 ft. an additional amount should be added for extra windows and doors. The necessity of this is obvious, for if a building is extended by 5 ft. or 6 ft. the extension is probably made by enlarging the rooms, while if it exceeds from 10 ft. to 12 ft. additional rooms are added which require additional windows.

Procedure

The first item to establish is the unit price for each kind of building material. For example, a price for dimension stock, a price for sheathing, finished flooring of various kinds and grades, siding, shingles, nails, etc.

If it is desired to set up the completed cost of the structure rather than only the amount of the lumber or material bill it is, also, necessary to establish a unit wage scale and production tables showing the average amount of work done per man hour. For example, it is not sufficient to know that 2x4's cost $40 a thousand but it is, also, necessary to know how much it will cost to install the 2x4's in the building. For this purpose, the average daily output is established per man. It is assumed that a carpenter will put in place a certain number of ft. b. m. of studding, joists, etc. This, of course, varies with the conditions and with the man, but it is easy enough to establish a fairly accurate average amount, at any rate it is absolutely necessary that some basis be established.

The next step is to take off a bill of material. The quantity of each item being set down with the price of the material opposite. The extension must then be made and the total obtained which is intended to represent the total cost of the basic structure.

The next step is to figure the cost per surface area of such fixed items as a 100 square feet of the following: Exterior walls, interior walls, floor construction, ceiling construction, roof construction, etc.

Having accomplished this, we may proceed with the actual work of estimating a group of structures. For this purpose we will take a five-room bungalow, the walls of which are indicated in solid black. See plate III. It is assumed that the exterior wall be moved outward as indicated in the diagram. In other words, the building is extended in each direction by one or ten feet. These figures in the examples following being adopted for facility in calculation. The reader will, without difficulty, be able to follow the calculations as set forth.

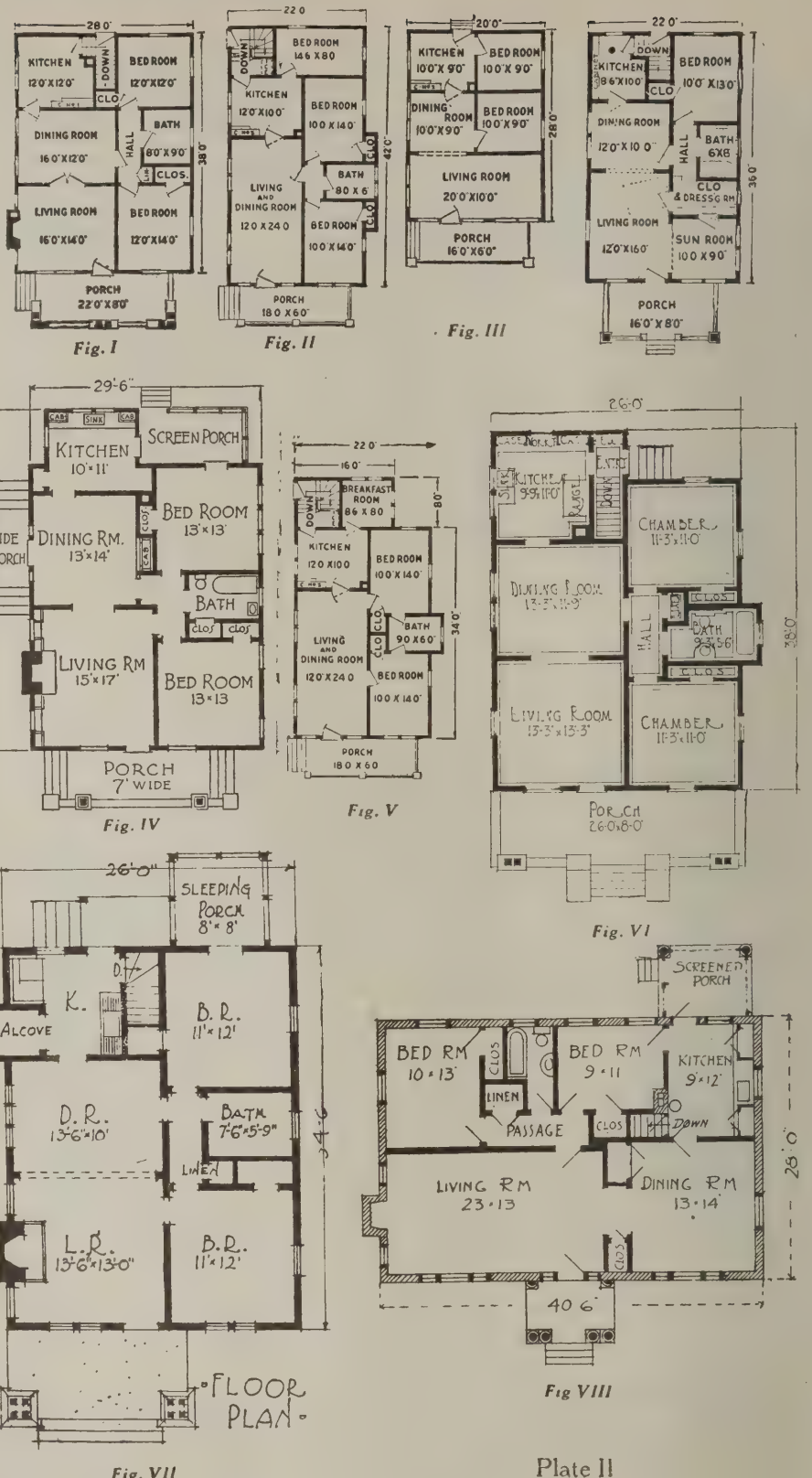


Plate II

Example

Basic building, area 1,040 sq. ft., size 26x40 ft., porch additional 10x14 ft. Total cost $4,327.00. Cost without front porch $4,064.00, porch $263.00, per square foot $3.90. Cost without plumbing, heating, porch and other constants $2,983.00, per square foot $2.86. Basic plan has approximately and equivalent of three cross partitions and 1½ vertical partitions.

The following costs are obtained for the surface areas:

1 lin. ft. of ext. cross partitions.....	
1 lin. ft. of int. cross partitions.....	61.00
1 lin. ft. of ext. longitudinal partitions	
1 lin. ft. of int. longitudinal partitions	$ 81.00

National Builder Style Sheet

Dr. Anderson residence, Bison City Building Corporation, Buffalo. *See plans on page 20*

Built by Bison City Building Corporation. *See article, pages 13-21*

A veritable little "Love Nest" indeed! Note the batten blinds and door with its long strap hinges and the big chimney. The fence is a delightful old-fashioned touch

This and the house above were built at Larchmont, N. Y., by C. C. Merritt; A. S. Whiton, architect. The porch roof is very well handled. Note the shutters on the entrance

Haven't you often noticed how the prettiest houses are usually built back in some shady nook where you can hardly see them? That's the place to build them if the shady nook is to be had

Both of the houses on this page are in Larchmont, N. Y., built by C. C. Merritt, with A. S. Whiton as the architect. Here is an adaptation of an old colonial idea to the front entrance

These houses, too, like those on pages 34 and 35, are in Larchmont, N. Y., where they were built by C. C. Merritt and designed and planned by A. S. Whiton, architect

This and the house shown above are built from the same plan

A house in River Forest, Ill. A garage addition is an important part of it, yet the symmetry of the colonial style has been preserved by building a porch and sleeping room on the opposite end

Wood houses, by painting, permit the use of any colors, for one is not restricted to the color of the material itself. A decided contrast between the walls and the exterior trim is produced here

One must be careful about cropping off the gable peaks on a house. Too often the result is disastrous to the beauty of the design. The architect of this California bungalow has used good judgment

Here is another way of making the roof "different"—by snubbing the entire gable edges. Note also the manner in which the roof of the projection on the side is handled

Patio residence in Los Angeles, Calif. John Byers, architect. See description and floor plans, B-12, on page 41. An attractive house for a sunny climate

A bungalow in Los Angeles, Calif., designed and planned by Floyd A. Dernier, architect. Plan No. 1880 and description are on pages 41 and 42. The garage and quarters above are a feature

A bungalow with a built-in garage. This sort of house, in various styles, is destined to become more and more popular as more and more automobiles are bought every year. See description and plans 1702-1703, page 42

A little house in Oak Park, Ill., that is by no means conspicuous, let it far outdistances its neighbors by the beauty of its design

Floor Plans of Style Sheet Houses

HOUSE NO. B-12

House No. B-12 has been especially designed for a building lot that ascends from the street on a steady and rather pronounced incline. Its plan, however, might very readily be adapted to a perfectly level site with equally satisfactory result.

The house incorporates a number of very interesting features. One of these is the garage that is attached to a rear corner and thus made an immediate part of the structure. Another particularly good feature is the patio embraced within the rear. This, it will be noticed, is directly accessible from the dining room, through a pair of French doors, and also from each of two bedrooms. It is floored with cement, contains a small pool sunk into the floor against the wall that closes it across the rear, and is connected with a side entrance to the garage by way of an ascending and descending stairway, with an elevated landing that overlooks the back garden.

B-12—Plan of patio residence shown on page 39

The front entrance to the house is designed with a little awning-covered corner porch and a small reception vestibule. The latter provides access to the living room through an open arched doorway and to the kitchen by way of a short, door-closed passage. The dining room occupies virtually the exact center of the plan so that practically every other room is pivoted about it. It, together with the living room and patio, divides the house into two wings, the one on the right containing two bedrooms and the main bathroom connected by a short hall, and the one on the left possessing the kitchen, kitchen-entry porch and the maid's room, or spare bedroom. A somewhat irregular level of floors prevails, resulting in the introduction of several short flights of steps between the various divisions.

The built-in features and closets are especially deserving of notice. These include a box seat at one side of fireplace in the living room, a linen cabinet in the hall of the right wing, a small shelf and drawer cabinet in the bathroom, excellent cupboards, a cabinet ironing board, a draft cooler-cabinet and other conveniences in the kitchen, a broom closet on the kitchen-entry porch, a closet for wraps in the reception vestibule, a spare closet for general storage in a short passageway of the left wing, and a good clothes closet for each of the three sleeping rooms. Also, off the maid's room there is a special lavatory and shower room while the kitchen-entry porch is equipped with a pair of stationary laundry tubs.

The house is of frame construction finished outside with white cement-stucco over metal lath. The roof consists partly of composition, on a flat surface, and partly of wood shingles, the latter being painted black. The slight wood trimming is done in gray, and the windows on the front are provided with black iron grills and with orange-colored awnings.

The interior is finished in pine throughout. In the reception vestibule, living room and dining room, including the two short halls, it is in light gray; in the bedrooms it is in old ivory, and in the kitchen and bathroom it is in white enamel. The plastered walls of the first-named group are finished in oil paint and in the bedrooms they are papered, while in the kitchen and bathroom they are given a smooth hard finish and enameled like the woodwork. Hardwood floors prevail throughout, except in the bathroom, kitchen and kitchen-entry porch the bathroom being floored with tile.

This house is built in Los Angeles, Calif., and was designed by John Byers, of Santa Monica, Calif.—*Chas. Alma Byers.*

HOUSE NO. 1880

The colonial-style bungalow house, No. 1880, includes a garage as a part of its plan. This garage is located on one of the rear corners, and a large bedroom, the only room above the ground floor, is provided above it. The garage may be entered from off the living room, and is equipped with a special storage closet.

The house is of frame construction, the outside walls finished with ordinary siding, painted white. The trimming color, confined to the window sash and the shutters at the front windows, is dark green. The shingled roof is painted grayish green. The chimneys are red brick; the foundation concrete, and the entrance porch is floored with cement.

Including the bedroom over the garage, the plan provides five rooms and bath, besides the customary kitchen-entry porch. Off one corner of the kitchen there is also a breakfast nook, furnished with the usual built-in seats and table. Each of the bedrooms possesses a clothes closet, and the kitchen is equipped with a draft cooler-closet, built-in cupboards and the other usual conveniences. There is a hall that connects with each of the first floor rooms, including the bathroom, and contains the stairway to the upstairs bedroom.

The interior is finished in Colonial style, the woodwork is pine in old ivory finish throughout except in the bathroom and kitchen. Excepting these divisions, the walls are papered and the floors are of hardwood. The woodwork of the bathroom and kitchen is in white enamel, and their walls are treated with a smooth, hard plaster surface and enameled like the woodwork, while their floors are of pine covered with linoleum. The living room contains a good fireplace, with a built-in bookcase at one side of it.

This bungalow is located in Los Angeles,

Calif., and was designed by Floyd A. Dernier, of that city.—*Chas. Alma Byers.*

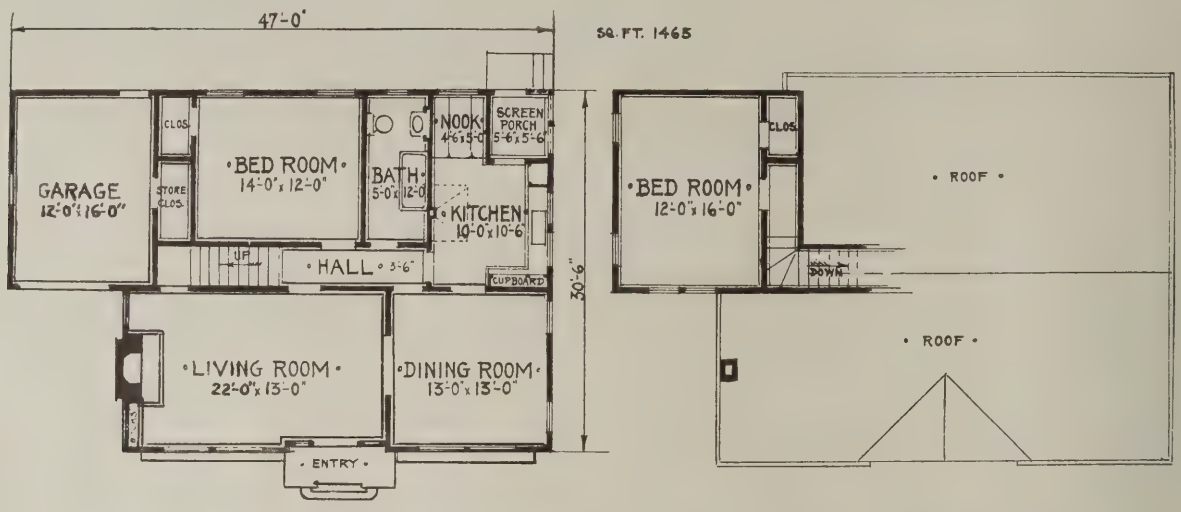
HOUSE NO. 1702

The architect of the house 1702 submits two different floor-plan lay-outs for producing the same front appearance and each, as will be seen, provides a built-in garage. One of the plans contains, in addition to the garage, four rooms and a sleeping porch on the first floor, and the other has four rooms without the sleeping porch, while both of them have a bedroom and bathroom on the second floor.

The house is of frame construction, with the outside walls finished with white cement-stucco on metal lath. The roof, possessing but very little slope, is of composition, surfaced with crushed granite; and the wood trimming consists of light gray for the window and door frames, green for the window sash and white for the entrance and garage doors. The foundation is of concrete, and the front porch is floored with cement.

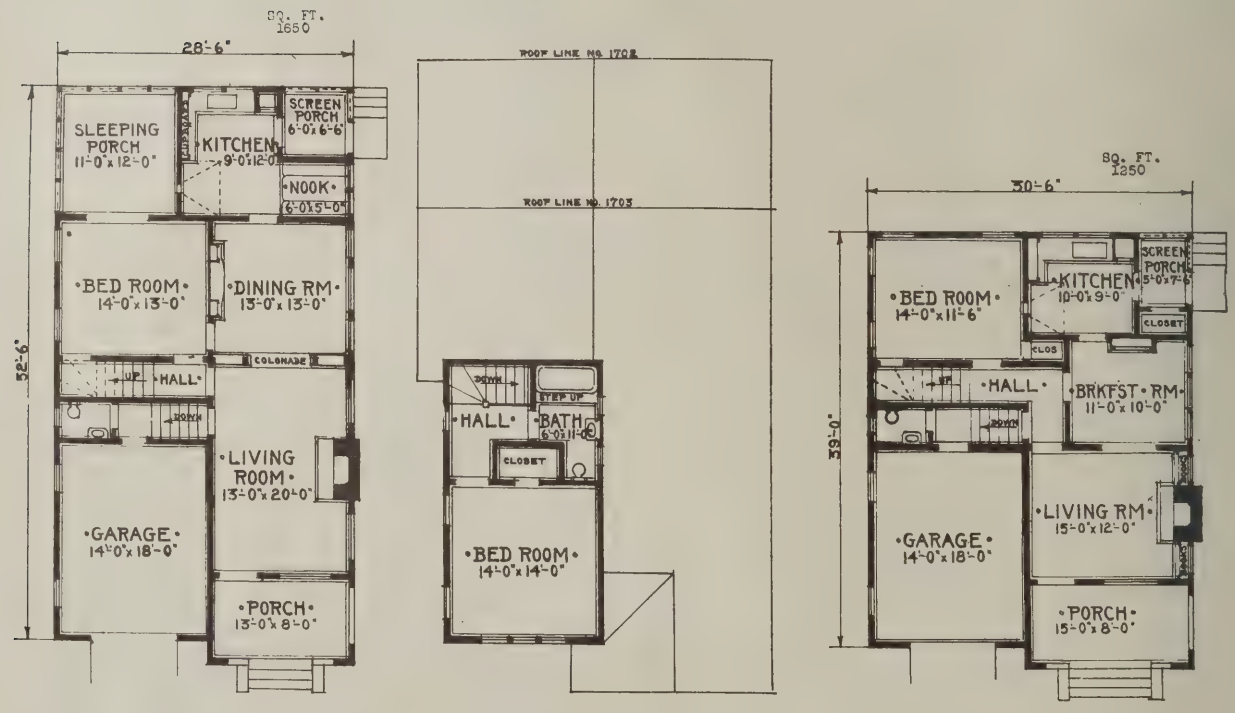
It will be seen that the larger plan contains living room and dining room joined together by a broad colonnade opening, and that the other has a small breakfast room off the living room instead of a real dining room. In the former arrangement there are built-in bookcases in the buttresses between the living room and dining room, a buffet in the dining room, and a small breakfast nook with built-in seats and table off the kitchen. The smaller plan provides built-in bookcases in the breakfast room and a storage closet at each side of the fireplace, a small buffet on the rear entry porch. The kitchen in both instances is equipped with a draft cooler-closet, built-in cupboards and a plaster hood for the range. There is a closet for each of the bedrooms, and the living room possesses a good fireplace.

Inside entry to the garage, down a short flight of steps, is provided in each plan, and there is, of course, a stairway to the second floor.



• FLOOR • PLAN • NO. 1880. •GARAGE • SECOND • STORY•

Plans of colonial-style bungalow shown on page 39



• FIRST • STORY • PLAN • NO. 1702 L.A. •SECOND • STORY • PLAN • NO. 1702 & 1703 • FIRST • STORY • PLAN • NO. 1703 L.A.

Plans of bungalow with built-in garage. See illustration on page 40

The interior finish consists of pine throughout. In the living room and dining room, or breakfast room this woodwork is in old ivory; in the sleeping rooms and hall it is in white paint, and in the bathroom and kitchen it is finished in white enamel. Excepting the kitchen, all first-floor divisions have hardwood floors and papered walls, while the walls of the upstairs bedroom are tinted. The walls of the kitchen and bathroom are finished with a smooth, hard plaster coat and enameled like the woodwork, and the floors of these divisions, including the second floor bedroom, are of pine.

This house, built on the larger scale, is located in Los Angeles, Calif., and was designed by Floyd A. Dernier, of that city.—*Chas. Alma Byers.*

A Two-Story House with Bungalow Lines

THE house described in this article is a combination of two-story house arrangement with bungalow lines. It is capped with a roof of exposed rafter design with broad (4-foot) overhang, and is cov-

Fig. 1—View showing the large five-foot window openings on first floor. All window widths are kept in even feet, avoidingfractional block. Note stucco surface substituted for block in second story

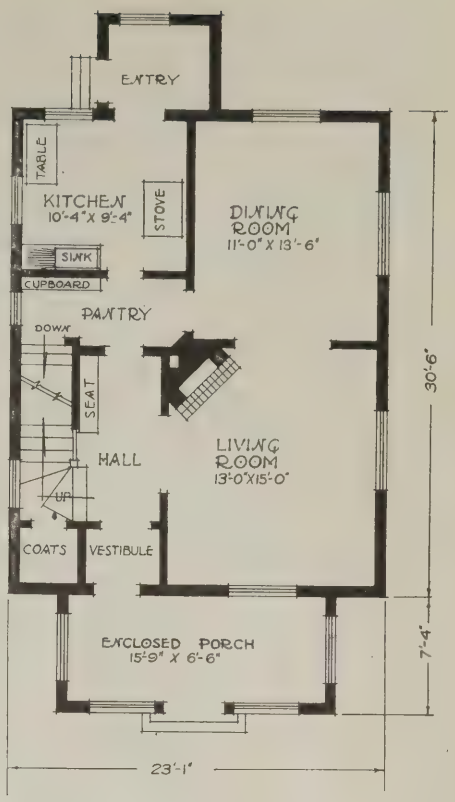
ered with cement shingles. To add to the bungalow effect, the ridge is discontinued 5 feet from the front and a rakish dip is given to a small front panel. The front porch roof is framed at corresponding angles and carries the same characteristic dip in the front.

The walls are of concrete block veneer construction. The vertical framing is of 2 by 4 studding, carrying floors of the usual frame type. The studding is covered with building paper, furring, plaster board and plaster. The concrete block veneer is made of gray plain face block 3 inches in thickness and 7 by 24 inches in surface dimensions. The block are laid in a ¼-inch bed of dark mortar made of gray portland cement and dark sand, 1:2½, with the addition of a small amount of hydrated lime. The joints are flush.

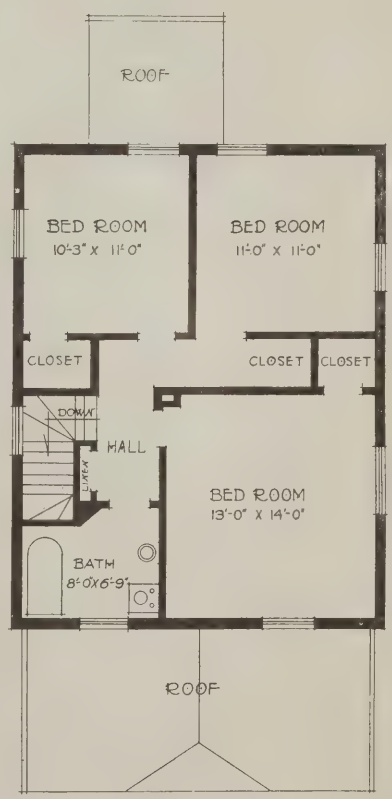
The concrete block were made in "slush" molds of 1:3 mixture of cement and sand and were cured with low pressure steam for 48 hours. The blocks weigh about 50 pounds each, except the corner blocks which are "L" shaped, with one leg 12 inches long and the other 24 inches long. The latter block weigh about 68 pounds. About 1700 block were used from the foundation to a point about three feet below the roof plates from which point portland cement stucco is used being placed on metal lath on the wood studding. Stucco is also used on the front of the porch above the eave line. Cast concrete sills are used throughout.

The accompanying plans indicate very pleasing interior arrangements. The house is given a spacious effect by the large openings between the hall, living room and dining room, which adjoin. The large fireplace in the living room adds a cozy touch. Being located in a part of the country where winters are long and severe, the large enclosed front porch adds more than proportionately to the comforts of the house. The coat closet off the stairway provides the needed closet space on the first floor.

A convenient serving pantry is a distinctive feature and effectively separates the dining room from the noise and odors of the kitchen. The second floor has three large bedrooms with roomy closets and a large bathroom. The linen cupboard is conveniently located and of ample capacity. Dean and Dean, Chicago, are the architects.



FIRST FLOOR PLAN



SECOND FLOOR PLAN

National Builder
House Designs Especially Prepared by The Architects Small House Service Bureau of the U S Inc
HOUSE NUMBER
6A45

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A SIX-ROOM COLONIAL HOUSE

A Six-Room Colonial House

House No. 6A45 Designed Especially for National Builder by The Architects' Small House Service Bureau of the United States

Copyright, 1923, Jointly by National Builder and The Architects' Small House Service Bureau of the United States

THE Colonial is an adaptable style for it builds equally well in brick or wood. This attractive six-room Colonial design is carried out in brick; the exterior details follow carefully the best Colonial architectural traditions, and arrangement of rooms is excellent.

This is a straightforward Colonial design, easy and economical to construct, impressive when completed, and offering large accommodations for the amount of floor space.

The plans call for wood frame, brick veneer, shingle roof, and brick outside chimney.

To impart to this modern home the true flavor of the early New England Colonial home a broken pediment treatment is given to the front entrance, iron grills fence the brick steps and the windows have long quaint blinds with slats below and solid wood above. While this home retains the exterior charm of the early Colonial dwelling house, added to it are those modern improvements which make life easier and more enjoyable.

The modern American likes a porch on his home, and this design provides a generous porch at the back, 13 ft. by 9 ft., which can be screened or glazed as desired. Double French doors lead from the living room to the porch.

This design belongs to the popular center hallway type. The living room runs the full depth of the house on one side, and on the other the space is divided between the cheerful corner dining room and the kitchen. Plaster arches throw living room, dining room and stairhall together, thus increasing the spacious effect of the first floor.

The living room has a fireplace with a wood mantel, brick hearth and brick facing.

Convenience for the housewife has been carefully considered in planning the kitchen. It is well equipped with built-in cupboards. Even a broom closet is provided in the rear entry and provision is made for an outside icing door.

Three good size bedrooms one very commodious, and a large bathroom complete the second story. There are large closets in each bedroom and two in the master's room. In all rooms ample wall space has been left for large furniture. The plan provides attic space and a full basement.

It will take a larger lot than 40 ft. to accommodate this house. It can be built upon a 45-ft. lot. It is designed to face north or west, but can be reversed for other facings.

The regular price for this plan is $30. Reversed plans are supplied without extra charge. These working drawings are shown in reduced scale in this issue and full-sized working drawing if desired can be secured by NATIONAL BUILDER readers at half price.

Specifications and Quantity Survey

EXCAVATING
160 cu. yds.

BACKFILLING
60 cu. yds.

FOUNDATION
If 12" concrete, 46 cu. yds. gravel, 186 sax cement
If 9" concrete, 37 cu. yds. gravel, 150 sax cement
If 12" tile, 22,400 CBM tile, 17 cu. yds. mortar
If 9" tile, 18,000 CBM tile, 14 cu. yds. mortar
12,000 face brick, 9 cu. yds. mortar, 490 pounds mortar color
1,150 face brick for steps

CEMENT FLOOR AND STEPS:
5 cu. yds. gravel
4 cu. yds. sand
56 sax cement

CHIMNEY
2,400 common brick
300 face brick top
56 lin. ft. flue tile 8x12
2½ cu. yds. mortar
250 inside face brick
120 fire brick
20 lbs. fire clay
16 sq. ft. hearth tile
2—8x12 clean outs
3—6" adjustable thimbles
1 cast iron throat and damper
1 ash dump
1 4x3x¼" angle
5 yards metal lath

LATH
9,500 wood lath

PLASTER
680 sq. yds on wood lath
15 sq. yds. on metal
15 sq. yds. Keene's cement

TILE FLOOR
34 sq. ft. ceramic tile
22 lin. ft. cove base

LUMBER
6—6x6-7 posts
44 lin. ft. 6x10 beam
88 lin. ft. 2x4 beam ribbon
88 lin. ft. 2x4 beam sill
3—2x4-16 stair horses
64 lin. ft. 2x4 basement partition plates
13—2x4-8 basement partition studs
210 ft. D. & M. basement partition sheating
19—2x10-14 first floor joist
19—2x10-20 first floor joist
50 lin. ft. 2x10 first floor joist box sill
4—2x10-14 headers and doubles
3—2x10-8 headers and doubles
4 ft. 2" plank for clean out cover
780 ft. com. bds. first floor sub-floor
1,032 ft. 13/16x1 1/2 first floor finish floor
330 lin. ft. 2x4 outside wall plates
107—2x4-16 outside wall studs
9—2x4-16 gable studs
10—2x4-14 opening doubles
4—2x4-16 opening headers
50 lin. ft. 1x4 ribbon
300 lin. ft. 1x3 bridging
1,200 lin ft. grounds
4—2x4-18 stair stringers
216 lin. ft. 2x4 first floor partition plates
70—2x4-9 first floor partition studs
4—2x10-5 opening headers
19—2x10-14 second floor joist
19—2x10-20 second floor joist
4—2x10-14 doubles and headers
780 ft. com. bds. second floor sub-floor
1,000 ft. 13/16x1 1/2 second floor finish floor
300 lin. ft. 2x4 second floor partition plates
94—2x4-8 second floor partition studs
17—2x6-18 second floor ceiling joist
230 ft. com. bds. third floor sub-floor
34—2x4-16 rafters
36 lin. ft. 1x6 ribbon rafter
4—2x4-16 dormer rafters
3—2x4-14 headers roof
3—2x6-16 headers ceiling second floor
12—2x4-10 porch rafters
10—2x4-9 porch ceiling joist
4—2x6-9 girder
2—2x6-14 girders
1,460 ft. com. bds. roof sheating

11M shingles
5—2x4-12 porch studs
50 ft. porch siding
150 ft. ⅝x4 ceiling porch
300 ft. ⅝x4-14 ceiling cornice
20—2x4-14 look outs
2,200 ft. shiplap outside wall sheating
25—2x4-16 scaffold and extras
15—2x6-14 scaffold and extras
6—2x8-16 scaffold and extras
4—2x10-20 scaffold and extras

MILLWORK—Frames:
3 single frames 8x10-3L-1⅜
1 mullion frame 8x10-3L-1⅜
2 window frames 10x14-12L-1⅜
3 window frames 9x14-12L-1⅜
2 window frames 10x12- 4L-1⅜
1 window frame 8x16- 6L-1⅜
9 window frames 9x12-12L-1⅜
1 triple casement frame 8x12-8L-1¾
2 segment top No. 302
1 half circle No. 283

Windows
5 cellar sash 8x10-3L-1⅜
2 windows 10x14-12L-1⅜
3 windows 9x14-12L-1⅜
2 windows 10x12- 4L-1⅜
1 window 8x16- 6L-1⅜
9 windows 9x12-12L-1⅜
3 sash 8x12-8L-1¾
2 segment sash No. 302
1 half circle sash No. 283

Storm Sash
5 storm sash 8x10- 3L-1⅜
2 storm sash 10x14-12L-1⅜
3 storm sash 9x14-12L-1⅜
2 storm sash 10x12- 4L-1⅜
1 storm sash 8x16- 6L-1⅜
9 storm sash 9x12-12L-1⅜
3 storm sash 8x12- 8L-1⅜
2 storm sash No. 302
1 storm sash No 283

Screens
5 screems 8x10- 3L-1⅜
2 screens 10x14-12L-1⅜
3 screens 9x14-12L-1⅜
2 screens 10x12- 4L-1⅜
1 screen 8x16- 6L-1⅜
9 screens 9x12-12L-1⅜
3 screens 8x12- 8L-1⅜
2 screens No. 302
1 screen No. 283

Shutters
2 pair shutters for windows 10x14-12L-1⅜ No. 524
2 pair shutters for windows 9x14-12L-1⅜ No. 524
5 pair shutters for windows 9x12-12L-1⅜ No. 524
1 pair shutters for windows 8x16- 6L-1⅜ No. 524

Exterior Door Frames
1 door frame 3'0x6'10-1¾
1 door frame 2'8x7' 0-1¾
1 door frame 4'8x7' 0-1¾
1 icing door frame

Outside Doors
1 door 3'0x6'10-1¾ C220
1 door 2'8x7' 0-1¾ No. 753
2 doors 2'4x7'0-1¾ No. 1600
1 icing door

Storm Doors
1 storm door 3'0x6'10-1⅜
1 storm door 2'8x7' 0-1⅜
1 pair door opening 4'8x7'0

Screen Doors
1 screen door 3'0x6'10
1 screen door 2'8x7'0
1 pair door openings 4'8x7'0-1⅜

Exterior Millwork
1 special front entrance trim
200 lin. ft. cornice
6 porch posts
2 half porch posts
4 lattice frames 1'6x8'0
32 lin. ft. porch soffit
32 lin. ft. porch facia
32 lin. ft. porch inside facia
50 lin. ft. porch cove
46 lin. ft. dental cornice
2 wood panels

Interior Doors
1 door 2'6x6'8-1⅜ No. 720
1 door 3'0x7'0-1¾ No. 1600
1 door 2'0x7'0-1⅜ No. 1102
2 doors 2'6x7'0-1⅜ No. 1102
3 doors 2'6x6 8-1⅜ No. 1102
5 doors 2'4x6'8-1⅜ No. 1102
1 door 2'0x6'8-1⅜ No. 1102
1 door 1'8x6'8-1⅜ No. 1102

Jambs
1 jamb 2'6x6'8
1 jamb 3'0x7'0
1 jamb 2'0x7'0
2 jamb 2'6x7'0
3 jamb 2'6x6'8
5 jamb 2'4x6'8
1 jamb 2'0x6'8
1 jamb 1'8x6'8

Interior Trim
3 sides trim 8x10-3L
1 sides mul. trim 8x10-3L
2 sides wd trim 10x14-12L
3 sides wd. trim 9x14-12L
2 sides wd. trim 10x12-4L
1 sides wd. trim 8x16-6L
9 sides wd. trim 9x12-12L
1 sides triple casement trim 8x12-8L
1 sides dr. trim 3'0x6'10
1 sides dr. trim 2'8x7'0
1 sides dr. trim 4'8x7'0
1 sides dr. trim icing door
1 astrogal for 7'0 door
2 side trim 2'6x6'8
2 side trim 3'0x7'0
2 side trim 2'0x7'0
4 side trim 2'6x7'0
6 side trim 2'6x6'8
10 side trim 2'4x6'8
2 side trim 2'0x6'8
2 side trim 1'8x6'8
1 flight basement stairs with rail
1 flight main stairs with rail
1 ladder to attic
1 scuttle door—frame and trim
1 medicine cabinet No. 2835
1 towel cabinet
1 3'0 seat with hinged cover
1 broom cabinet
1 3'0 kitchen cabinet
1 3'6 kitchen cabinet
1 utility door—jamb and trim
1 drop table
1 drain board
1 meter cabinet
1 pair doors for coat cabinet
1 jamb for coat cabinet
2 sides trim for coat cabinet
1 mantle shelf
558 lin. ft. base
558 lin. ft. base shoe
558 ft. lin. base moulding
28 lin. ft. base chair rail
160 lin. ft. cornice
312 lin. ft. picture moulding
36 lin. ft. closet shelving
26 lin. ft. closet hook strip
26 lin. ft. closet rod
20 lin. ft. corner bead
16 lin. ft. threshold

RE-ENFORCING STEEL
18 rods ⅜"-13'0
8 rods-9'0
4 rods-8'0

STRUCTURAL STEEL
128 lin. ft. 3½x3½x5/16 angles

CAULKING
28 window opening
4 door opening
1 icing door opening
1 coal chute

WEATHER STRIPPING
5 sash
23 windows
4 doors

INSULATION
1800 ft. for walls
700 ft. for ceiling
2½M lath
3 rolls red rosin for floors
4 rolls water proof for floors
4 rolls tar felt for roof

ORNAMENTAL IRON
2 pair ornamental curved rail with posts
1 ornamental lantern

WIRING—Basement:
4 outlets
2 gas outlets
Above Basement
19 light outlets
1 bell outlet
1 buzzer outlet
14 switch outlets
11 base plug outlets
1 push button outlet
1 three way switch

TINWORK
58 lin. ft. ridge roll
7 finials
50 lin ft. valley tin
20 lin. ft. flashing tin
4 sheets sheet tin
250 tin shingles
84 lin. ft. gutter
6 gutter ends
25 gutter hangers
4 nipples
4 strainers
4 offsets
4 elbows
70 lin. ft. conductor pipe
16 conductor hooks
50 lin. ft. chimney flashing
200 lin. ft. corner beads

HARDWARE
5 cellar sash sets
17 sash locks
17 sash lifts
3 casement window sets
28 storm sash sets
28 screen sets
10 sets of shutter hardware for pairs
1 front door set with butts
1 rear door set with butts
1 double door set with butts
1 double door set with butts
1 icing door set with butts
2 storm door sets with butts
1 storm door set for pair of doors
1 screen door set for pair of doors
2 screen door sets
1200 lbs. assorted nails
450 lbs. sash weights
4 hanks sash cord
10 lbs. assorted brads
1 coal chute
1 floor hinge
2 push plates
14 inside door sets with butts
18 door bumpers
6 dozen clothes hooks
6 stair rail brackets
1 pair hinges for attic stair
1 pair butts, 1 hook } scuttle door
1 pair ornamental butts, 1 cupboard turn, 1 cupboard turn, 1 pair ornamental butts } medicine cabinet / towel cabinet
1 pair hinges for seat
3 pair hinges, 1 cupboard turn, 1 blind catch } broom closet
4 friction stays—utility cabinet
1 pair drop leaf hinged brackets for drop table
1 ornamental butt, 1 cupboard turn } meter cabinet
1 set hardware for double doors in coat cabinet
2 pair butts, 1 cupboard turn, 1 blind catch } kitchen cabinet
4 pair ornamental butts, 2 cupboard turns, 2 blind catches, 2 drawer pulls, 2 pair ornamental butts, 1 cupboard turn, 1 blind catch } kitchen cabinet
1 gross shelf bracket pegs

EXTERIOR PAINTING
34 gal. shingle stain
4 gal. trim paint
2 gal. oil
1 gal. turpentine
½ gal. shellac
1 gal. sash and screen paint
5 lbs. putty
1 gal. cement floor paint

INTERIOR PAINT
14 gal. white
12 gal. enamel
3 gal. shellac
13 gal. interior varnish
6 gal. shellac for floors
7 gal. floor varnish
1 gal. boiled oil
1 gal. alcohol
2 gal. benzine
4 lbs. putty
3 dozen sheets sandpaper
3 packages steel wool

HEATING
1 hot air heating plant 15,000 ft. capacity with 8 base registers

PLUMBING
1 floor drain
1 laundry tub
1 kitchen sink
1 lavatory
1 tub
1 closet
1 ice box drain
1 sewer and water service
1 hot water tank with coil

MATERIALS		ELECTRIC WIRING SYMBOLS			
CONCRETE		CEILING OUTLET		3 WAY SWITCH	
BRICK		DROP CORD		GAS OUTLET	
WOOD		BRACKET		PUSH BUTTON	
PLASTER		BASE PLUG		BELL OUTLET	
		SWITCH		BUZZER	

Dimensions are taken to outside of foundation walls, to outside of studs on exterior walls and center of studs for partitions.

Foundation walls shown concrete may be stone, brick, concrete block or load bearing hollow tile.

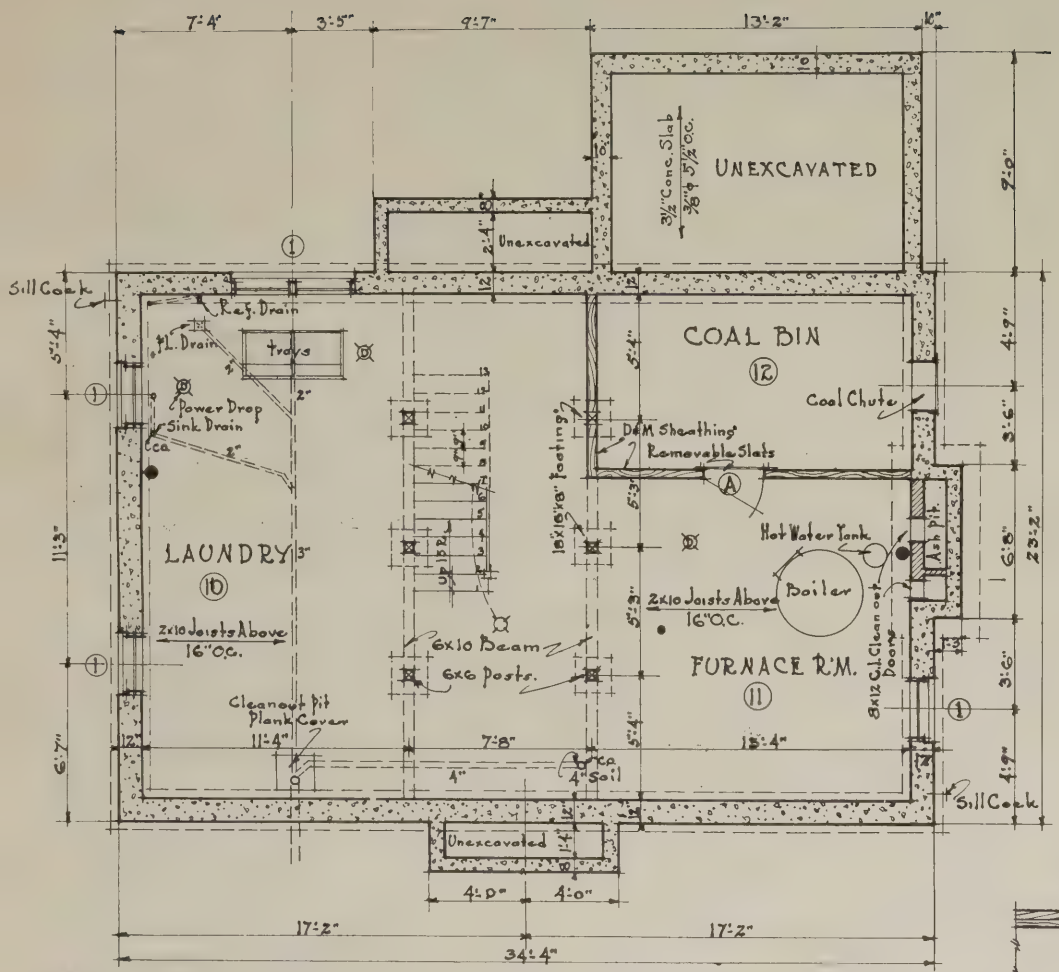
Where building ordinances permit, foundation walls may be 9 in. thick (with 20x9-in. footings) except in case of stone which shall be 18 in. thick.

Stock numbers refer to mouldings in Universal Millwork Design Book No. 20. In case these mouldings can not be procured, others of similar design and size may be substituted.

Provide 1⅜-in. screen and storm sash for all exterior openings except ice door unless otherwise noted. Bottom rail of storm sash to have vent.

BUT HERRIN IS AT SIXES AND SEVENS.—The well known real estate firm of Lence & Danforth of Herrin, Ill., announces competition with the Almighty as follows in the Herrin *Journal:*

Male and female
Created he them,
Four and five-room
Create we them.

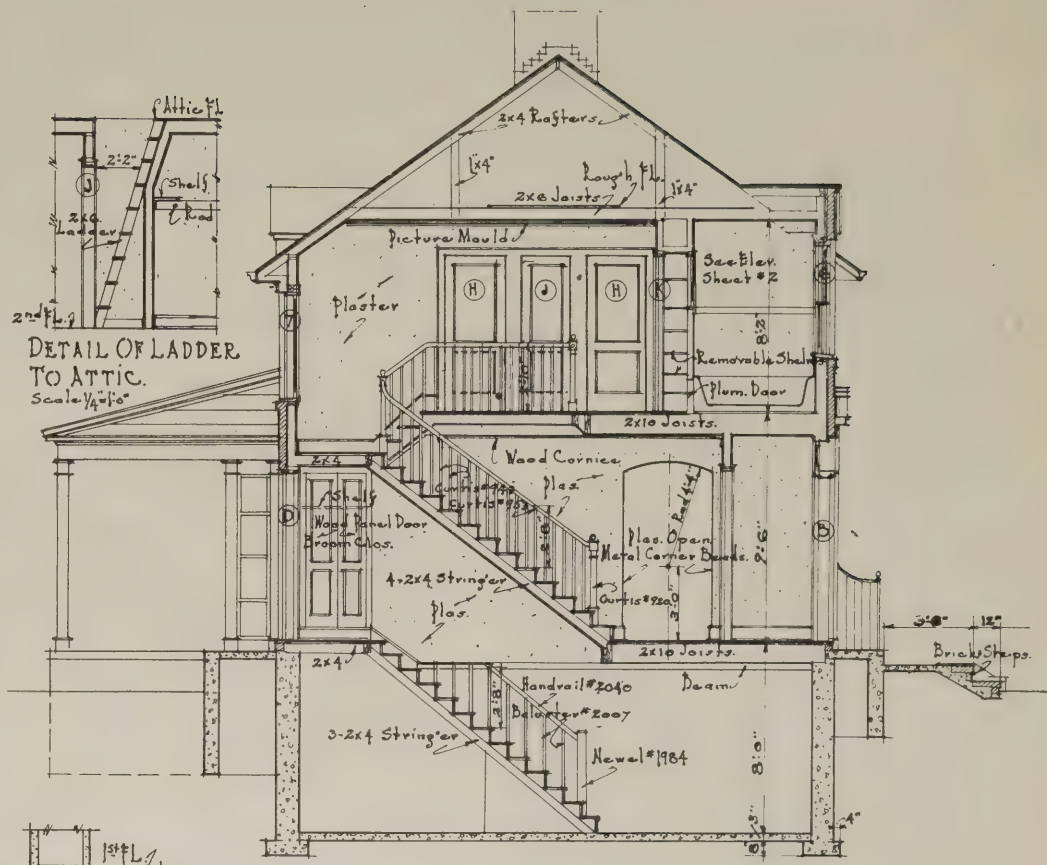


BASEMENT PLAN

Scale ¼"=1'-0"

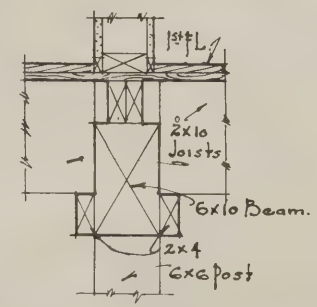
DETAIL OF LADDER TO ATTIC.

Scale ¼"=1'-0"



SECTION

Scale ¼"=1'-0"



DETAIL OF BEAM

Scale ¼"=1'-0"

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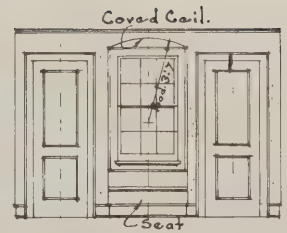
SCHEDULE OF WINDOWS

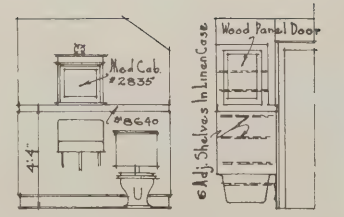
QUANTITY	TYPE	DESCRIPTION	NO. OF LIGHTS	SIZE GLASS	SIZE OF OPNG FOR SASH	THICKN'SS SASH	FRAME
5	1	Basement	3	8X10	2'-4"x1'-3"	1⅜"	See Detail
2	2	Double Hung	12	10X14	2'-10½"x5'-2	"	"
3	3	" "	12	9X14	2'-7½"x 5'-2	"	"
2	4	" "	4	10X12	2'-1" x 4'-6"	"	"
1	5	" "	6	8X16	2'-4"x 3'-2"	"	"
9	6	" "	12	9X12	2'-7½"x 4'-6"	"	"
3	7	Casement	8	8X12	1'-1" x 4'-5"	1¾"	"
2	8	Cable #302				1⅜"	Plank
1	9	" #283			2'-10" x 1'-7"	"	"

SCHEDULE OF DOORS

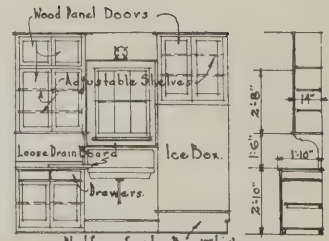
QUANTITY	TYPE	SIZE	DESCRIPTION	REMARKS
1	A	2'-6"x6'-8"x 1⅜"	UNIV. #720	5 Panel.
1	B	3'-0"x6'-10" x 1¾	Curtis #1220	Front.
1	C	3'-0" x 7'-0" x 1¾	UNIV. #1605	Vest.
1	D	2'-8" x 7'-0" x 1¾	" #753	Rear.
2	E	2'-4"x 7'-0"x 1¾	" #1600	Porch.
1	F	2'-0" x 7'-0" x 1⅜	" #1102	Interior
2	G	2'-6" x 7'-0" x 1⅜	" "	"
3	H	2'-6" x 6'-8" x 1⅜	" "	"
5	I	2'-4" x 6'-8" x 1⅜	" "	"
1	J	2'-0" x 6'-8" x 1⅜	" "	"
1	K	1'-8" x 6'-8" x 1⅜	" "	3" Side & Top Stile



BEDROOM #205 TOWARD REAR



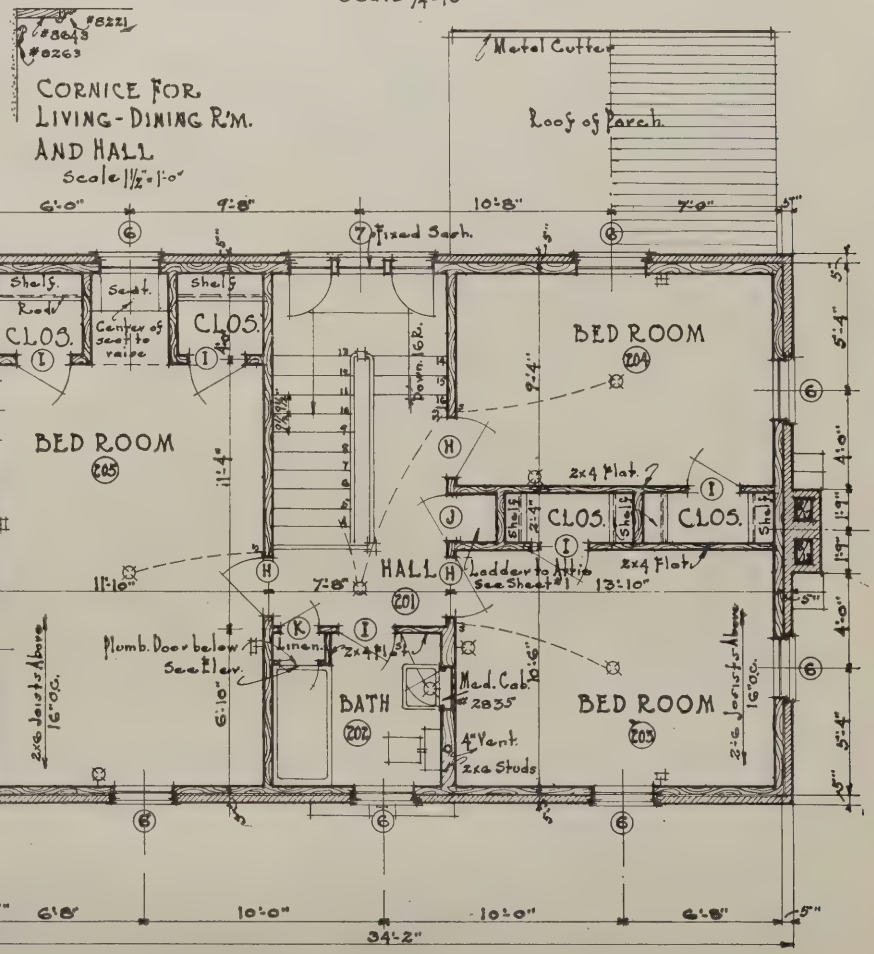
ELEVATIONS OF BATH R'M.
Scale ¼"-1'-0"

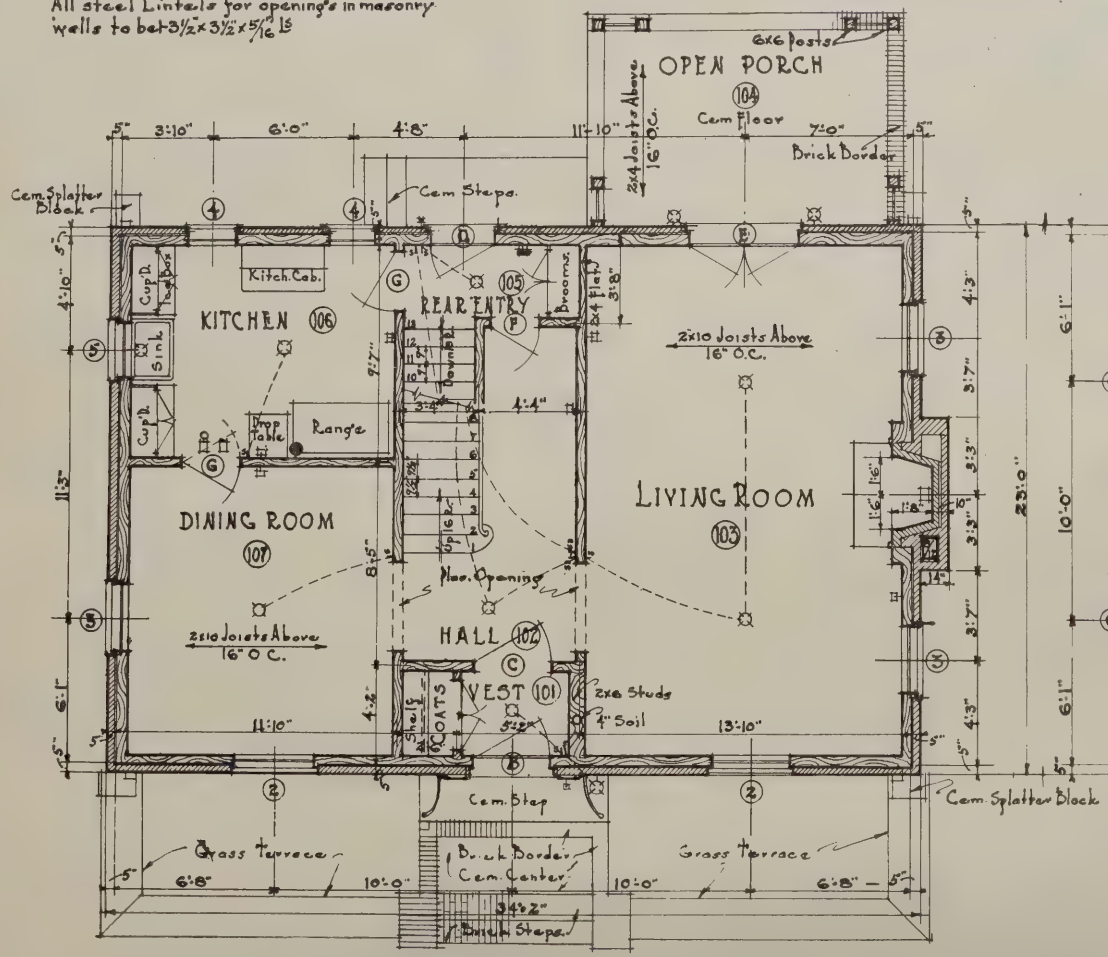


KITCHEN-TOWARD SINK

SECTION

Note
All steel Lintels for openings in masonry walls to be 3½"x3½"x5/16" L's





FIRST FLOOR PLAN

Scale ¼"-1'-0"

SECOND FLOOR PLAN

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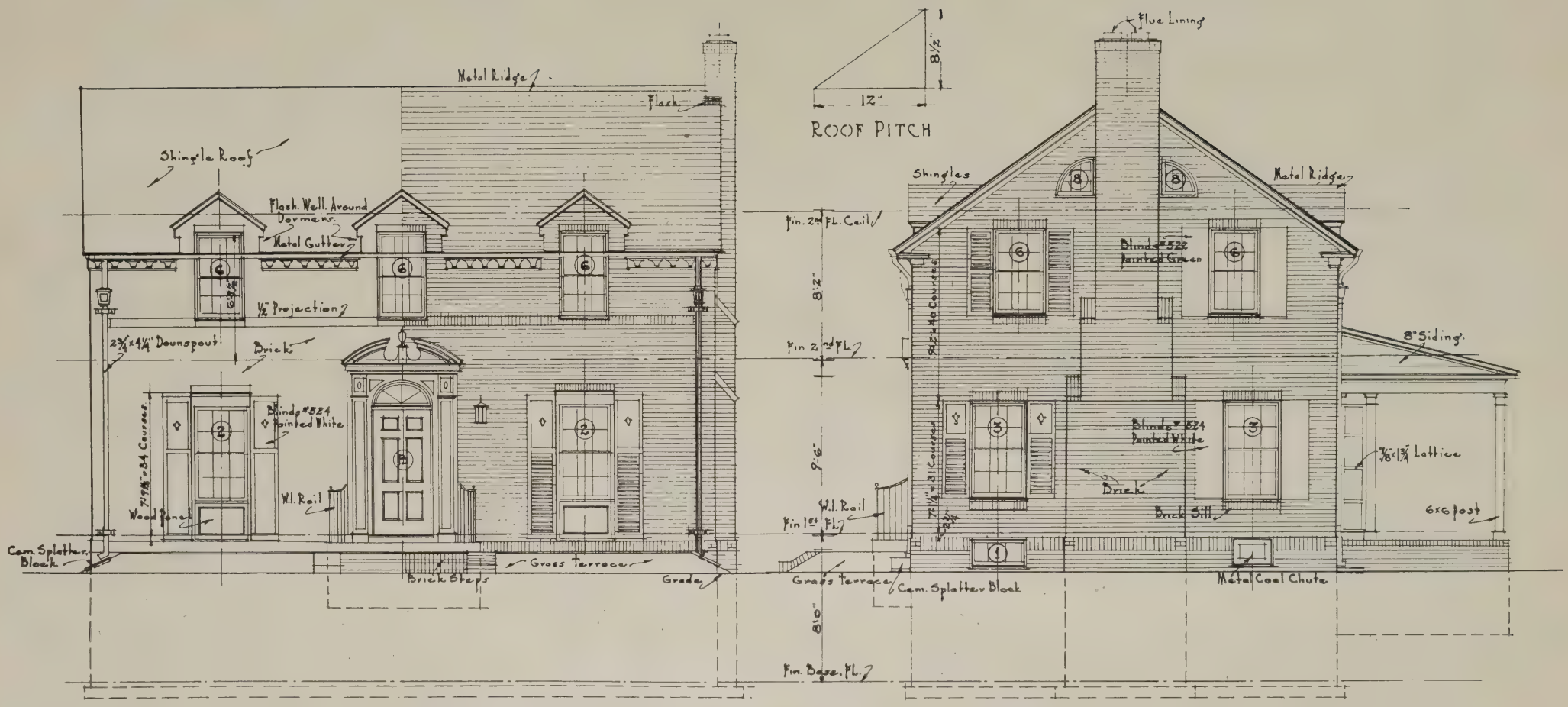

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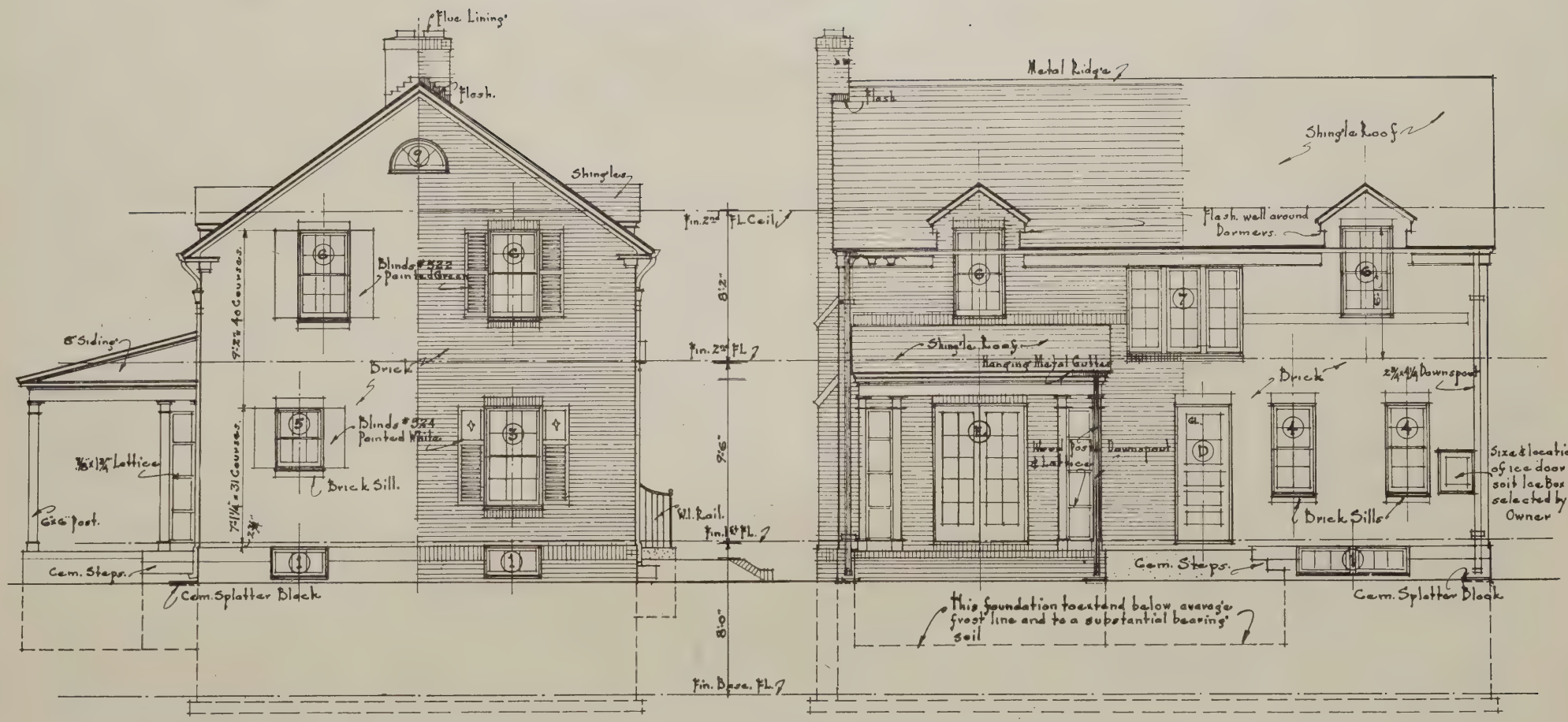

SIDE ELEVATION Scale ¼"-1'-0" REAR ELEVATION

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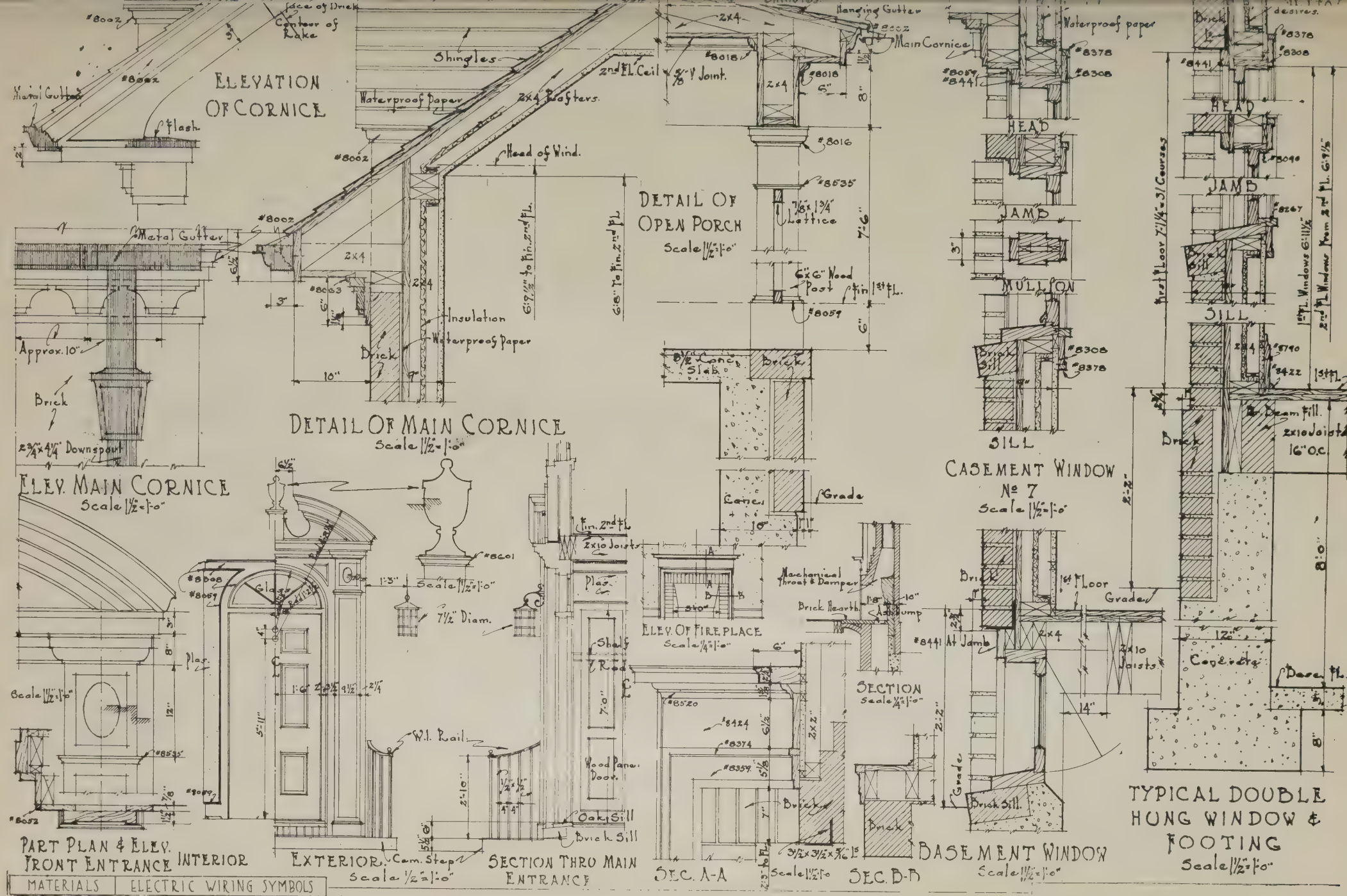

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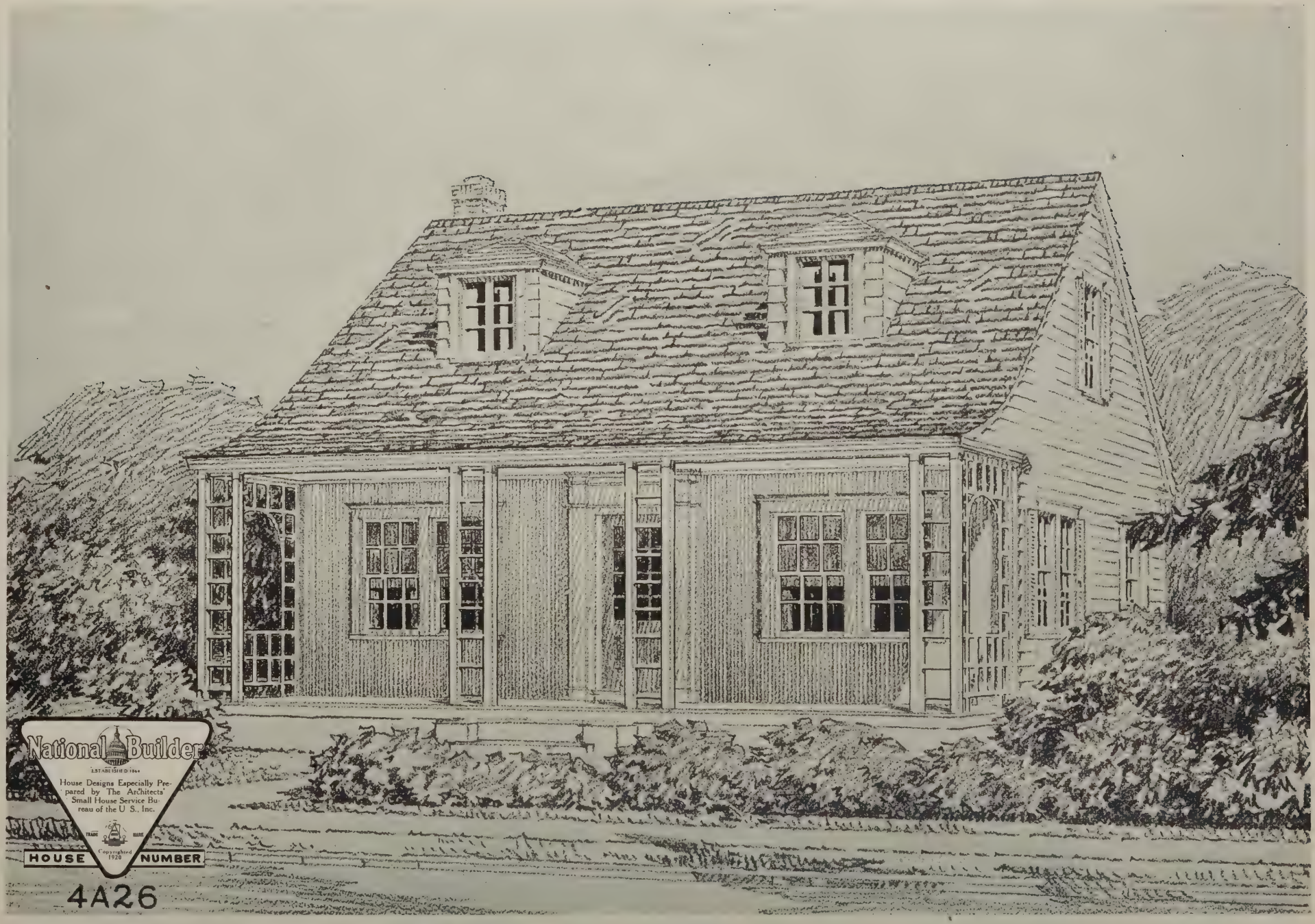

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A DUTCH COLONIAL BUNGALOW

A Dutch Colonial Bungalow

House No. 4A26 Designed for National Builder by The Architects' Small House Service Bureau of the United States

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TO the American home builder whose customers admire a big shaded porch where they can cool off in hot weather, this bungalow features this attraction in the porch 6 ft. wide and 30 ft. long, extending across the entire front of the house. It is built under the main roof and the square wood columns and open lattice give it a restfully inviting aspect.

The low homelike effect of the true bungalow has been achieved in this design. The plans call for frame construction with siding for exterior finish, cement base, shingle roof and exterior stucco wall under the porch. The exterior finish could be shingles or stucco if desired.

Another advantage of this plan is that, in addition to the four rooms and bath on the first floor, the second story could be finished at any time to provide a large storage room and another comfortable bedroom. There is a complete basement with a well-lighted laundry and storage and furnace rooms.

The living room and dining room become practically one large room because of the wide-cased opening between them. The large closet in the living room can serve as a coat closet, or it can be converted into a closet bed; which would increase the sleeping accommodations.

The floor plan is of a home easily cared for. It fulfills the constant demands for an attractive modern home with the rooms on one floor.

The kitchen is compact and especially well arranged. The sink is under a window with drain boards and built-in cupboards on either side. There is a broom closet in the rear entry. Provision has been made for outside icing so that the iceman need not muddy the kitchen floor.

Perhaps nothing better can be said of the downstairs sleeping room in this house than that it is a corner room, with cross ventilation with an exceptionally large closet, and with excellent space for furniture. A linen closet opens off the hall convenient to the bath and bedroom.

This bungalow can easily be accommodated on a 40-ft. lot. It is designed to face south, west or north, and can be reversed for an east facing.

The specifications and quantity survey is appended, with reduced reproductions of the working plans and construction details.

The regular price for these plans is $20, reversed plans supplied without extra charge. The full sized plans will be supplied by special arrangement to readers of NATIONAL BUILDER at half price.

Specifications and Quantity Survey

EXCAVATING: 180 cu. yds.

BACKFILL: 45 cu. yds.

FOUNDATIONS:
If 12″ concrete, 45 cu. yds. gravel, 182 sax cement
If 9″ concrete, 34 cu. yds. gravel, 138 sax cement
If 12″ tile, 21,000 CBM tile, 16 cu. yds. mortar
If 9″ tile, 15,600 CBM tile, 12 cu. yds. mortar

CEMENT FLOOR:
5 cu. yds. gravel
3 cu. yds. sand
50 sax cement
15 lin. ft. cement step
4 spatter blocks

CHIMNEY:
840 common brick
120 face brick
32 lin. ft. 8x12 flue tile
¾ cu. yds. mortar
3 yds. metal lath
1 8x8 cleanout
1 8″ thimble

LATH: 9½M lath

INTERIOR PLASTER:
680 sq. yds. walls and ceilings
15 sq. yds. Keene's cement

EXTERIOR PLASTER:
22 sq. yds. on cement or tile
30 sq. yds. stucco on metal

TILE FLOORS:
40 sq. ft. ceramic tile
24 lin. ft. cove base

LUMBER:
1—2x4-18 girder
2—6x6-7 posts
1—6x10-9 girder
1—6x10-20 girder
2—2x4-20 girder
60 lin. ft. 2x4 girder plates
4—2x4-12 stair stringers
4—2x4-14 headers
3—2x4-16 partition plates
11—2x4-8 partition studs
160 ft. 6″ D & M partition sheating
4 ft. 2″ plank cleanout cover
24—2x10-14 first floor joist
24—2x10-12 first floor joist
24—2x6-7 first floor joist
60 lin. ft. 2x10 box sill
30 lin. ft. 2x6 box sill
240 lin. ft. 1x3 bridging
4—2x10-14 headers
3—2x10-14 doubles
900 ft. com. bds. first floor sub-floor
1,088 ft. 13/16x1 1/2 first floor finish floor
260 ft. 4″ edge grain porch flooring
260 ft. 4″ ceiling porch
108 lin. ft. 2x4 outside wall plates
90—2x4-12 outside wall studs
10—2x4-12 outside wall upper plates
34—2x4-14 opening doubles
6—2x4-12 opening headers
26—2x4-12 gable studs
4—2x4-16 gable porch studs
10—2x4-16 dormer studs and plates
90 lin. ft. 2x10 porch girder
4—2x10-7 porch girders
30—2x4-7 porch ceiling joist
60 lin. ft. 1x4 ribbon
4—2x4-14 stair horses
300 ft. No. 1 bds. grounds
8—2x4-12 bottom plates first floor partitions
84—2x4-9 first floor studs
16—2x4-12 double top plates
2—2x10-7 opening headers
6—2x10-4 opening headers
24—2x8-14 second floor joist
24—2x8-12 second floor joist
4—2x8-14 doubles
2—2x8-16 headers, etc.
660 ft com. bds. second floor sub-floor
860 ft. 13/16x1 1/2 second floor finish floor
90 lin. ft. 2x4 second floor partition plates
40—2x4-12 second floor partition studs
24—2x6-8 porch rafters
24—2x4-7 second floor ceiling joist
7—2x4-10 second floor ceiling joist
48—2x4-20 rafters
20—2x4-14 look outs
32 lin. ft. 1x6 ribbon rafters
4—2x4-16 rafter headers
3—2x6-16 braces
20—2x4-16 scaffold
5—2x10-14 scaffold
1,500 ft. roof sheating
14M shingles
1,850 ft. shiplap wall sheating
1,470 ft. 8″ siding wall sheating

MILLWORK—Frames:
5 cellar frames 8x10-3L-1⅜
3 single frames 10x12-12L-1⅜
3 mul. frames 10x12-12L-1⅜
5 single frames 10x16-6L-1⅜
1 mul. frame 10x16-6L-1⅜
1 single frame 10x16-2L-1⅜

Windows:
5 cellar sash 8x10-3L-1⅜
9 windows 10x12-12L-1⅜
7 windows 10x16- 6L-1⅜
1 window 10x16- 2L-1⅜

Storm Sash:
5 storm sash 8x10- 3L-1⅛
9 storm sash 10x12-12L-1⅛
7 storm sash 10x16- 6L-1⅛
1 storm sash 10x16- 2L-1⅛

Screens:
5 screens 8x10- 3L-1⅛
9 screens 10x12-12L-1⅛
7 screens 10x16- 6L-1⅛
1 screen 10x16- 2L-1⅛

Shutters:
5 shutter sets for windows 10x12-12L-1⅛ No. 522
1 shutter set for window 10x16- 6L-1⅛ No. 522

Outside Door Frames:
1 door frame 3′0x6′8-1¾
1 door frame 2′6x6′8-1¾
1 icing door frame

Outside Doors:
1 door 3′0x6′8—1¾
1 door 2′6x6′8-1¾
1 icing door

Storm Doors:
1 storm door 3′0x6′8-1⅛ glazed
1 storm door 2′6x6′8-1⅛ glazed

Screen Doors:
1 screen door 3′0x6′8-1⅛ fancy
1 screen door 2′6x6′8-1⅛ common

Outside Millwork:
40 lin. ft. dormer cornice
88 lin. ft. gable cornice
32 lin. ft. rear cornice
48 lin. ft. front cornice
2—6x8 lattice frames
80 lin. ft. porch cove
48 lin. ft. porch soffit
48 lin. ft. inside facia
48 lin. ft. outside facia
1 special entrance
6 lin. ft. threshold
8 porch posts

Interior Doors:
1 door 2′6x6′8-1⅜ No. 720-5P

5 doors 2'6x6'8-1⅜ No. 1102
2 doors 2'4x6'8-1⅜ No. 1102
3 doors 2'0x6'8-1⅜ No. 1102

Jambs:

1 jamb 2'6x6'8
5 jambs 2'6x6'8
2 jambs 2'4x6'8
3 jambs 2'0x6'8
1 jamb 7'0x6'8

Interior Trim:

5 sides trim 8x10-3L
3 sides single trim 10x12-12L
3 sides mul. trim 10x12-12L
5 sides single trim 10x16-6L
1 side mul. trim 10x16-6L
1 side single trim 10x16-2L
1 side door trim 3'0x6'8
1 side door trim 2'6x6'8
1 side icing door trim
2 sides door trim 2'6x6'8
10 sides door trim 2'6x6'8
4 sides door trim 2'4x6'8
6 sides door trim 2'0x6'8
2 sides opening trim 7'0x6'8
1 scuttle frame and door and trim
1 flight basement stairs
1 flight main stairs
1 medicine cabinet
1 broom cabinet
1 3'0 table
1 4'6 kitchen cabinet
1 2'0 kitchen cabinet
1 drain board
1 linen closet
8 lin. ft. closet shelving
8 lin. ft. closet hook strip
8 lin. ft. closet clothes rod
430 lin. ft. base
430 lin. ft. base shoe
430 lin. ft. base moulding
20 lin. ft. corner bead
294 lin. ft. picture moulding
104 lin. ft. ceiling cove
70 lin. ft. chair rail
1 meter cabinet

HARDWARE:

5 cellar sash sets
17 sash locks
17 sash lifts
22 sets storm sash hardware
22 sets screen hardware
6 sets shutter hardware
1 front door set with 3 butts
1 front door set with 3 butts
1 icing door set
2 storm door sets
2 screen door sets
1 floor hinge
2 push plates
10 inside door sets with butts
420 lbs. sash weights
4 hanks sash cord
1,400 lbs. assorted nails
6 lbs. assorted brads
1 coal chute
4 dozen buttons and screws
13 door bumpers
4 dozen clothes hooks
1 drain board bracket
1 pair ornamental butts } medicine cabinet
1 cupboard turn }
1 pair hinges for scuttle door
1 pair ornamental butts } broom cabinet
1 cupboard turn }
1 pair drop leaf table hinge brackets
6 pair ornamental butts
4 cupboard turns }
2 blind catches } kitchen cabinet
4 drawer pulls }
1 moulding board pull }
1 set bin castors }
1 bin pull } kitchen cabinet
5 pair ornamental butts }
3 cupboard turns }
2 blind catches
1 pair ornamental butts } meter cabinet
1 cupboard turn }

TINWORK:

46 lin. ft. ridge roll
5 finials
25 lin. ft. valley tin
48 lin. ft. flashing tin
1 saddle
4 sheets sheet tin
300 tin shingles
2 8x8 screened vents
62 lin. ft. gutter
20 gutter hangers
4 gutter ends
4 strainers
4 nipples
4 offsets
4 shut offs
4 elbows
40 lin. ft. conductor pipe
12 conductor hooks
20 lin. ft. 6" flashing tin

INSULATION:

1500 ft. fiber insulation
1½M lath
3 rolls red rosin floors
3 rolls tar felt, roof
4 rolls tar felt walls

CAULKING:

22 window openings
1 coal chute
2 doors
1 icing door

WEATHER STRIPPING:

17 check rail windows
2 doors
1 icing door

EXTERIOR PAINTING:

42 gal. shingle stain
12 gal body paint
4 gal. trim paint
2 gal. oil
1 gal. turpentine
1 qt. orange shellac
1 gal. porch floor paint
½ gal. screen paint
½ gal. sash color
5 lbs. putty

INTERIOR PAINTING:

13 gal. white paint
11 gal. enamel
4 gal. shellac
12 gal. interior varnish
7 gal. shellac for floors
8 gal. floor varnish
1 gal. boiled oil
½ gal. alcohol
1 gal. benzine
3 lbs. putty
3 dozen sheets assorted sandpaper
2 pkgs. steel wool

WIRING:

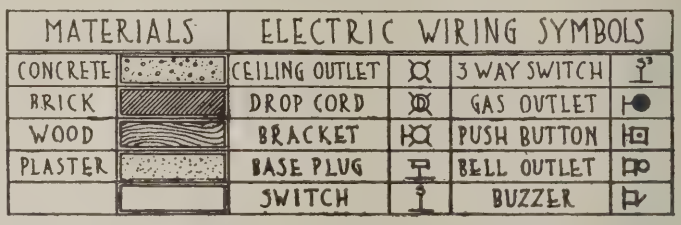
1 three way switch
3 gas outlets
1 power drop
13 light outlets
8 switch outlets
7 base outlets
2 push buttons
1 bell
1 buzzer
1 service cabinet

HEATING:

1 15,000 ft. hot air furnace with piping for 8 base outlets and 4 returns including register faces and smoke pipe

PLUMBING:

1 sewer and water service
1 hot water tank with piping and furnace coil
1 laundry—2 part tub
1 floor drain
1 tub with fittings and piping
1 lavatory with fittings and piping
1 toilet, fittings and piping
1 kitchen sink, fittings and piping
Vents and wastes for all fittings with roof flanges and caps
2 sill cock connections
1 48 gas range with connections and vents



Dimensions are taken to outside of foundation walls, to outside of studs on exterior walls and center of studs for partitions.

Foundation walls shown concrete may be stone, brick, concrete block or load bearing hollow tile.

Where building ordinances permit, foundation walls may be 9 in. thick (with 20x9-in. footings) except in case of stone which shall be 18 in. thick.

Stock numbers refer to muoldings in Universal Millwork Design Book No. 20. In case these mouldings can not be procured, others of similar design and size may be substituted.

Provide 1⅛-in. screen and storm sash for all exterior openings except ice door unless otherwise noted. Bottom rail of storm sash to have vent.

All closets to have shelf, hook-strip and hanger-rod.

To Enforce Illinois Architectural Act

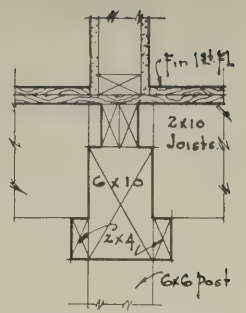
DIRECTOR A. M. SHELTON, of the Department of Registration and Education of the state of Illinois has sent out letters of warning to the building commissioners of all towns of 10,000 or over throughout the state to enforce the Illinois architectural act.

"As director of the Department of Registration and Education, whose duty it is to enforce the law," his warning reads, "I wish to call your specific attention to the provisions of the law, which are that the supervision of the erection of buildings is as much architectural practice as the preparation of plans and specifications, and that the only buildings costing in excess of $7,500 that may be planned and supervised by unregistered parties are those buildings erected by the contractor's and owner's own employes, and the building must be for their own use. Manifestly, if a portion of said buildings are erected by contract, said owner or builder is not employing his own men and therefore becomes liable under the law.

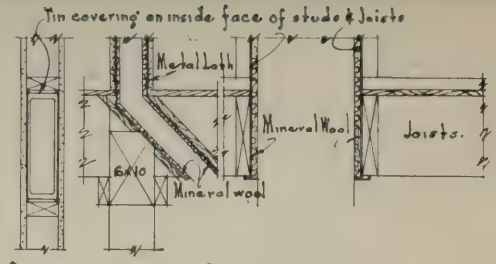
Urges Co-operation

"Recently several hundred complaints against owners and builders have been filed with the department. Under the law, each and every person found guilty is liable to a fine of $25 to $200 for each offense, and the courts have ruled in similar cases that each day constitutes a separate offense.

"Will you kindly co-operate with the state department in bringing about a more general observation of the provisions of the law relating to buildings? The department will greatly appreciate your courtesy if you will report all violations observed.

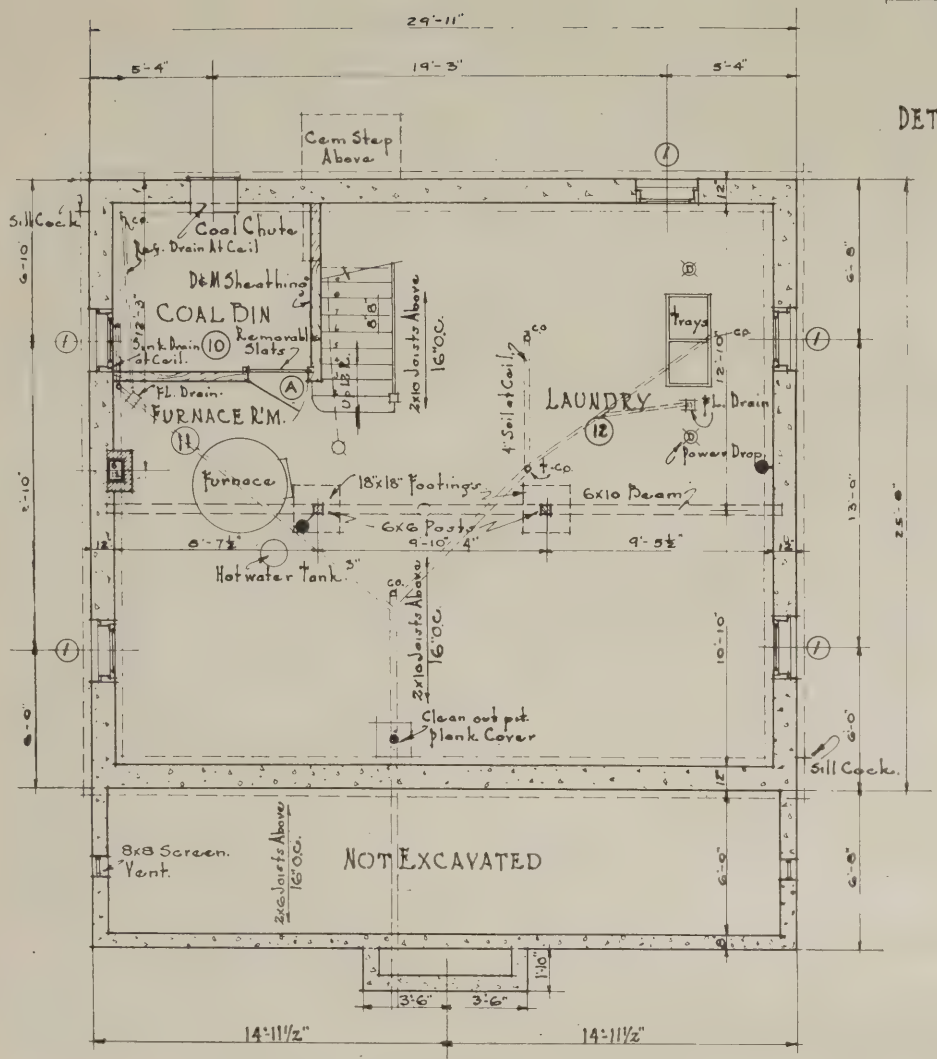


DETAIL OF BEAM
Scale 1½"=1'-0"

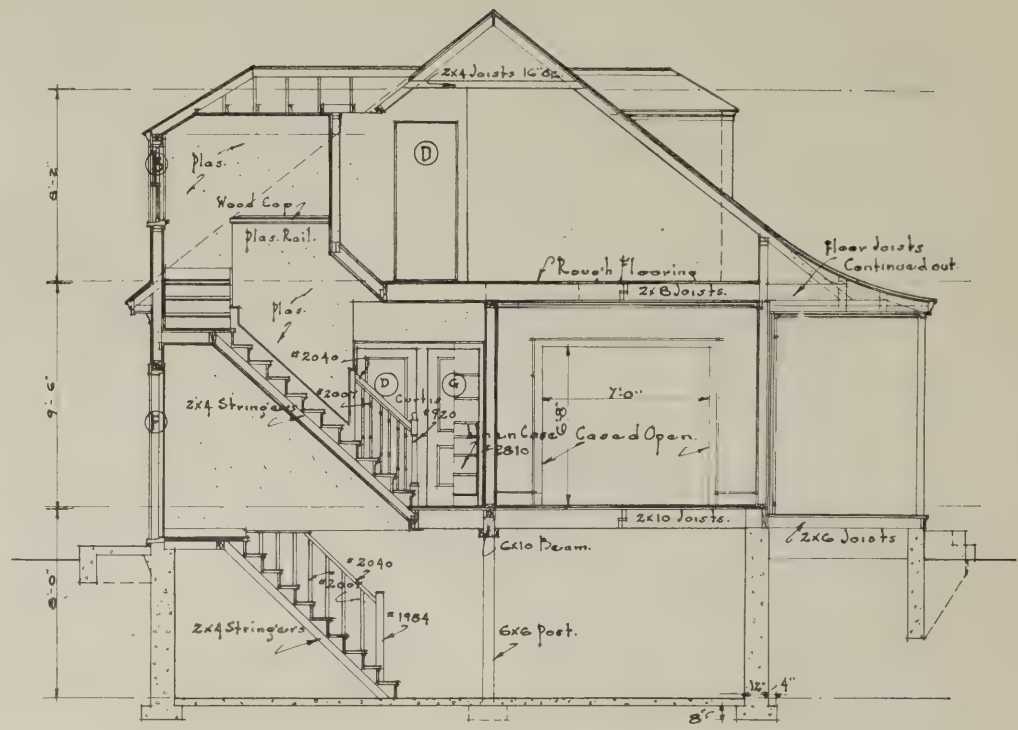


PLAN SECTIONS.

In case hot air furnace and piping are used this construction of fire stopping around pipes passing between floor joists and studs is recommended.



BASEMENT PLAN
Scale ¼"=1'-0"



SECTION.
Scale ¼"=1'-0"

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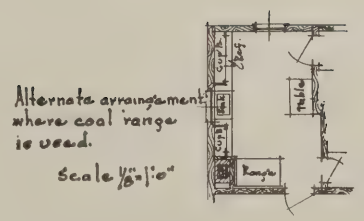
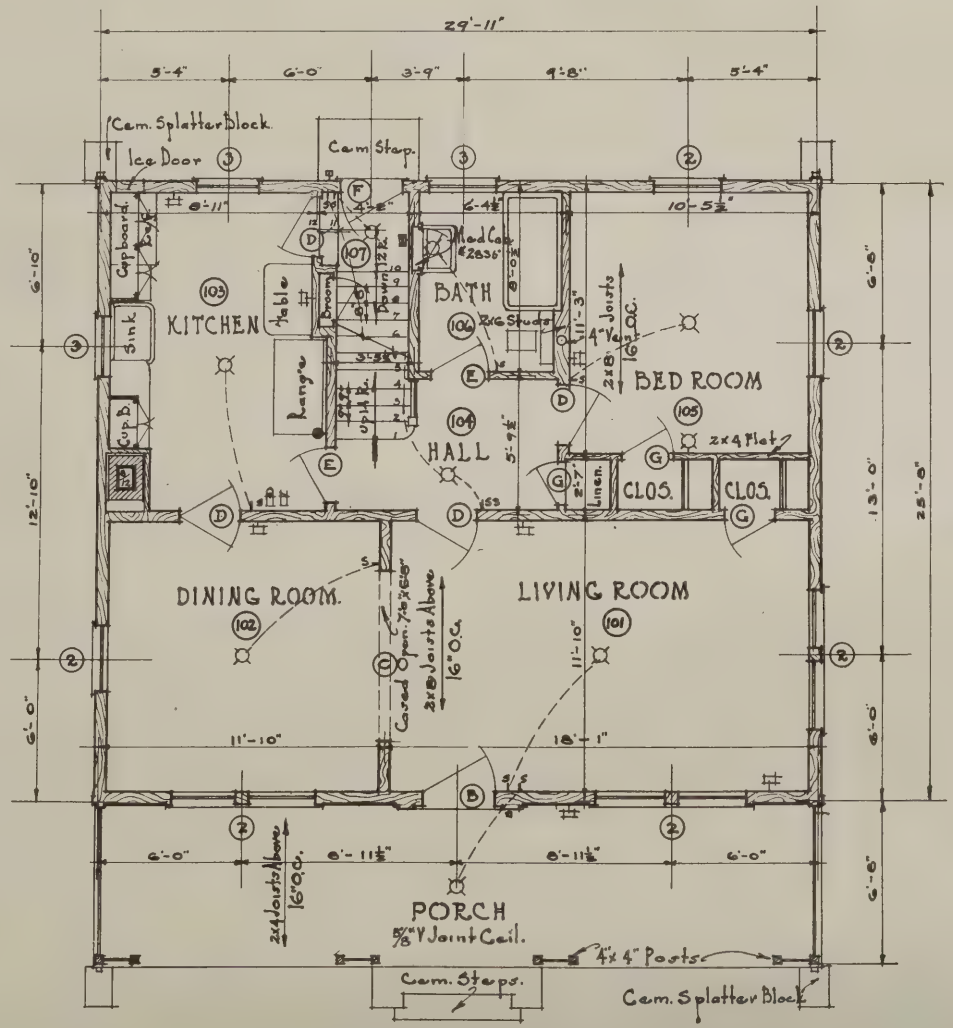
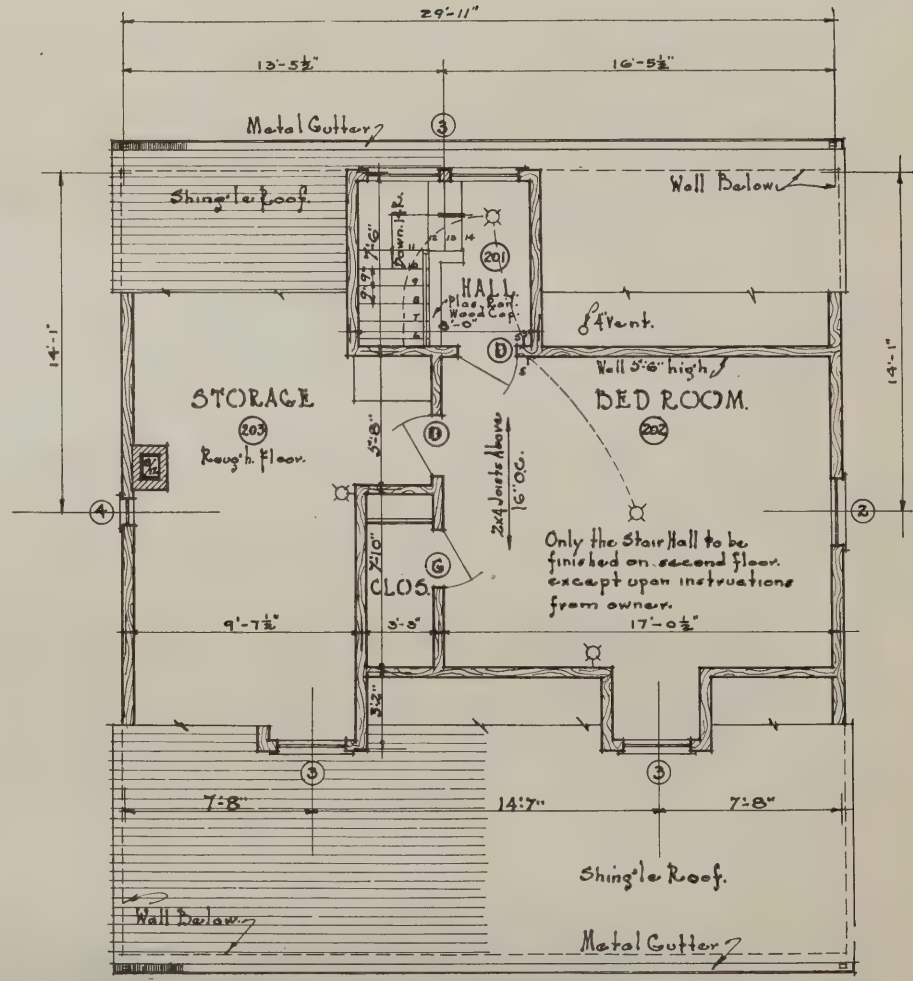


SCHEDULE OF WINDOWS							
QUANTITY	TYPE	DESCRIPTION	No. of LIGHTS	SIZE GLASS	SIZE OF OPNG FOR SASH	THICKNESS SASH	FRAME
5	1	Basement	3	8X10	2'-4" x 1'-3"	1 3/8"	See Detail
9	2	Double Hung	12	10X12	2'-10½" x 4'-6"	"	"
7	3	" "	6	10X16	2'-10½" x 3'-2"	"	"
1	4	" "	2	10X16	1'-2" x 3'-2"	"	"

SCHEDULE OF DOORS				
QUANTITY	TYPE	SIZE	DESCRIPTION	REMARKS
1	A	2'-6"x6'-8" x 1 3/8"	UNIV. #720	5 Panel
1	B	3'-0"x6'-8" x 1¾"	Sea Elev.	Front.
1	C	7'-0"x6'-8"		Casad Open.
5	D	2'-6"x6'-8"x1 3/8"	Univ #1102	Interior
2	E	2'-4"x6'-8"x1 3/8"	" "	"
1	F	2'-6"x6'-8"x1¾"	" #753	Rear
3	G	2'-0"x6'-8"x1 3/8"	" #1102	Interior



FIRST FLOOR PLAN



SECOND FLOOR PLAN.

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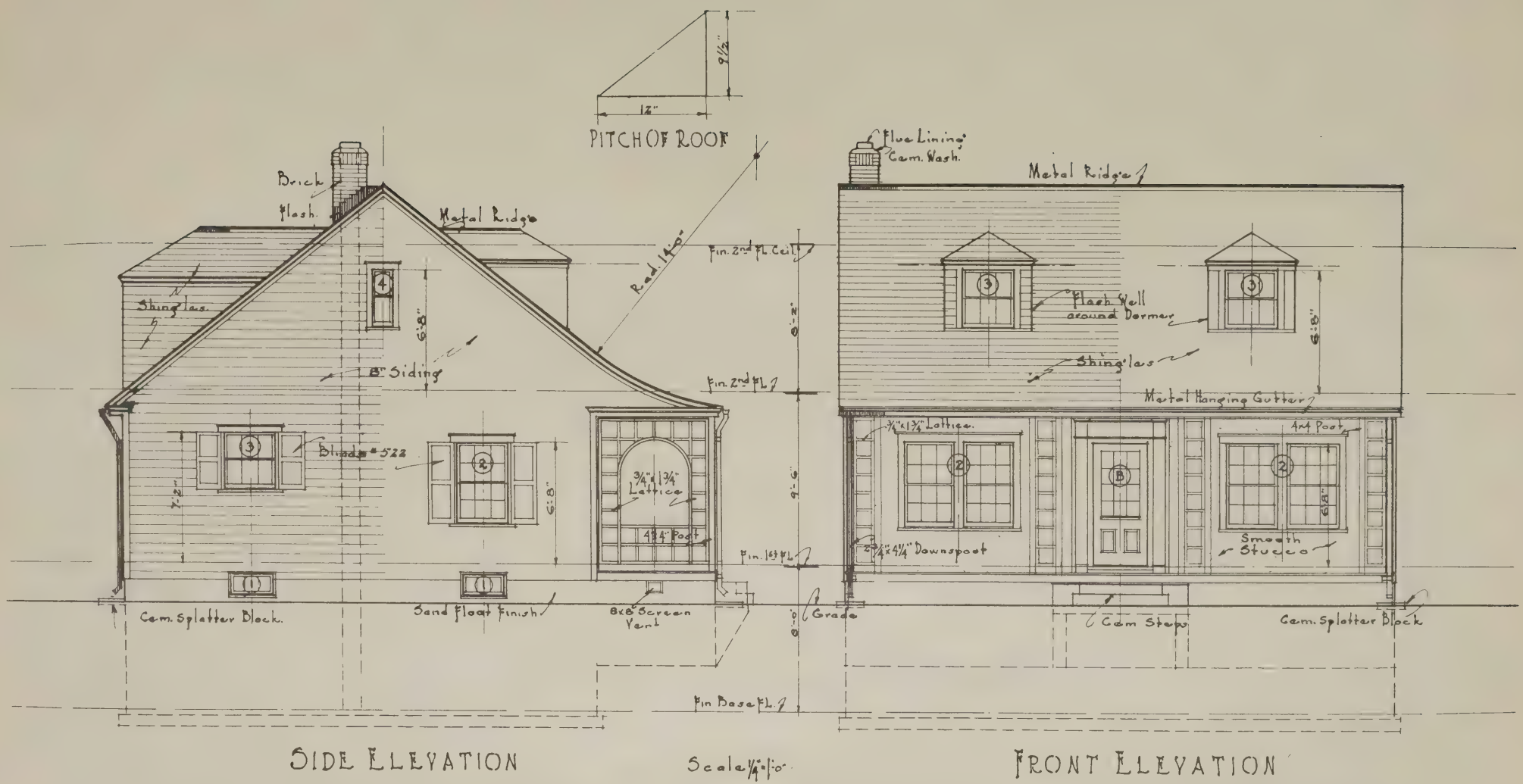

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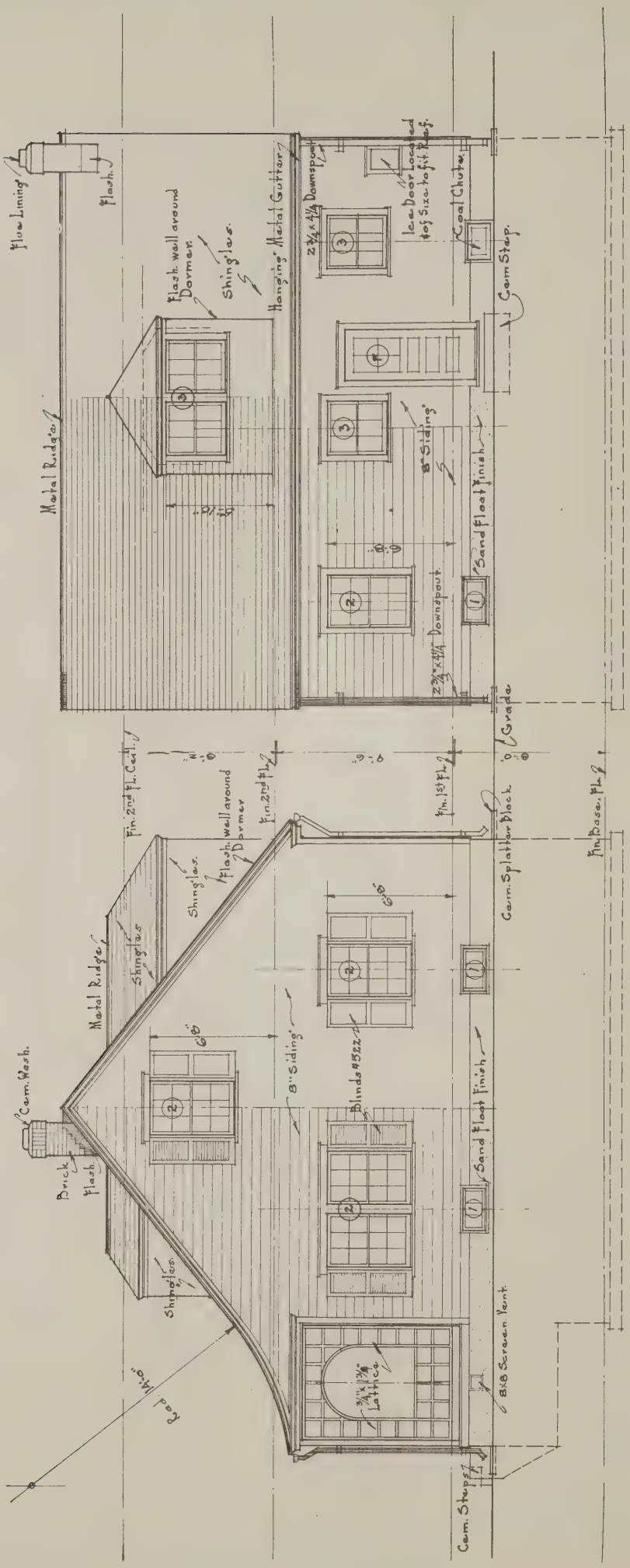

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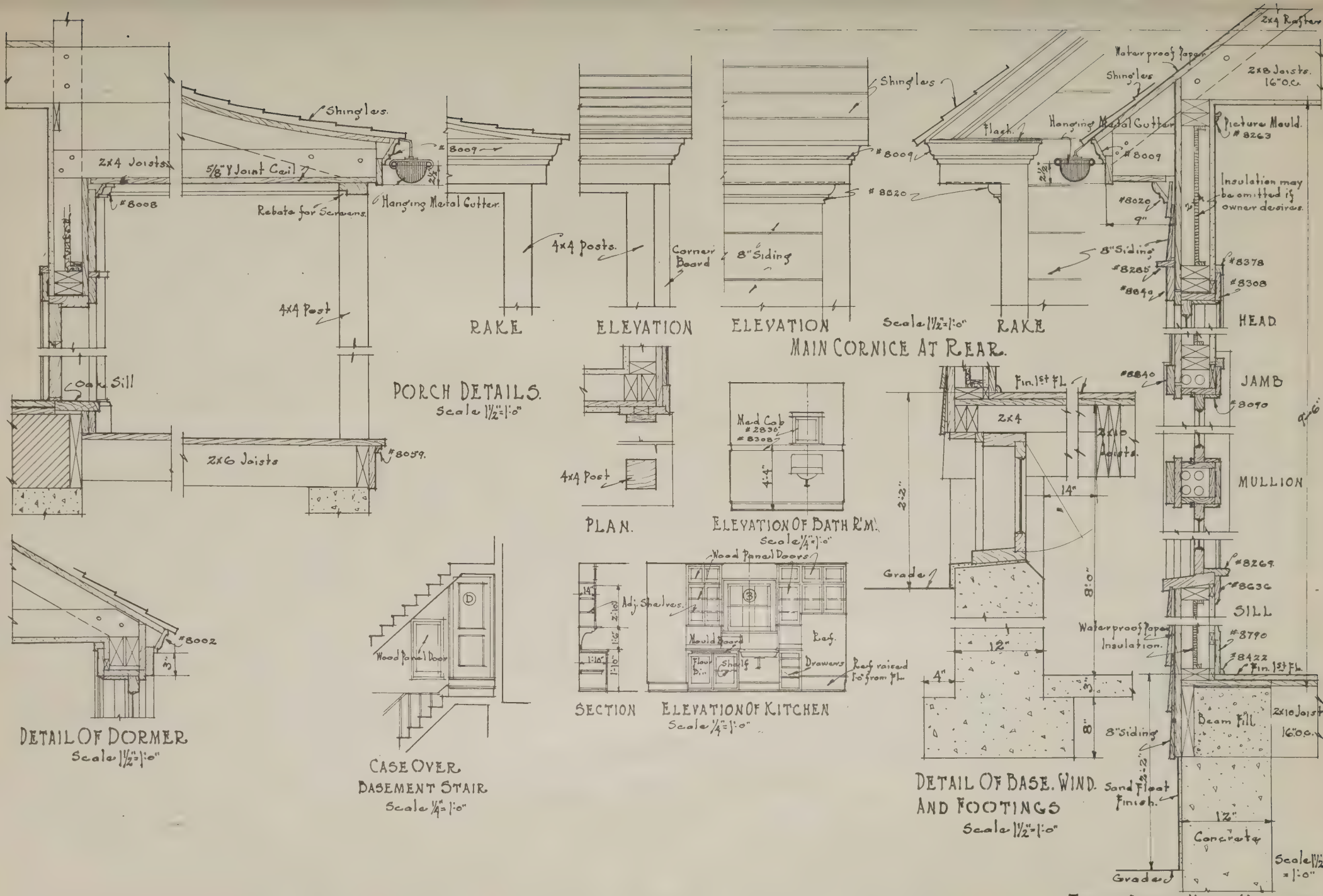

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Merchandising Houses

THE elements in a merchandisable house are: (1) Suitable location; (2) good design; (3) good materials and sound construction; (4) equipment of proved quality. Now and then houses are sold by builders and real estate developers which have only one, or possibly none of these points in their favor; but the builder, contractor or real estate man who sells such houses is not founding his business upon sound business principles and will not continue to prosper in any one locality long—certainly not very long if he has competitors who do build houses with sound selling points.

Similarly, a contractor whose houses lack these selling points is not building up his reputation as a contractor or crafstman, although he may be "getting by" temporarily. Although, as the contractor he sometimes may not be directly responsible for location, design, or equipment, the time is fast approaching when reputable contractors will more and more realize their joint responsibility with the owner or architect, or both, for the finished product; and as the buying public comes to know more about what a "finished" product should be the less will reputable contractors be ready to undertake work in which they can not take a justifiable pride of craftsmanship.

The Best in Small House Designs

NATIONAL BUILDER has never operated a plan-service department. The function of NATIONAL BUILDER is to provide a *medium of valuable and useful information* for architects, builders, contractors and all others who are engaged in the profession or business of building.

From time to time articles are published which will aid builders in the selection of suitable locations; or to adapt the house design to the location. All the time expositions of good construction are being published, and every effort is being made to emphasize the importance of good construction, as well as other good business methods. And every issue contains a wealth of valuable information on reputable machinery, equipment and materials; both in the editorial and the advertising pages. And, now, through the co-operation of The Architects' Small House Service Bureau of the United States, Inc., NATIONAL BUILDER has begun the systematic publication of complete *house designs*—designs which represent the very best available architectural talent in the United States in the small house field.

These designs have, or *if rightly used certainly should have,* a very definite sales value to the builder or contractor who makes use of them. The Architects' Small House Service Bureau is a nationally known institution. Its "Home Builders' Clinic" is a standard feature in the newspapers throughout the length and breadth of the land. To say that a house is built in accordance with the Small House Bureau's designs is equivalent to saying a statue or sculpture is the work of St. Gaudens, or Lorado Taft, or some other well-known artist.

How to Use the Designs and Plans

There seems to be two obvious ways for builders and contractors to make direct use of the Architects' Small House Service Bureau plans as published in this and succeeding issues of NATIONAL BUILDER. One way is to go ahead and build the houses and sell them as Small House Service Bureau houses—which means the same in the house-building industry that "Cadillac" or "Pierce-Arrow" means in the automobile industry. The other way is to show copies of NATIONAL BUILDER to your clients and let them pick their house plans from *plans of real quality.*

NATIONAL BUILDER subscribers—architects, contractors, builders, realtors, and dealers—can purchase full sets of blueprints, specifications, contract form, bills of materials and the full architectural service of The Architects' Small House Service Bureau, of any of the bureau houses detailed in NATIONAL BUILDER for 50 per cent less than the regular price, which will make them cost $8 to $20 per set of plans, etc., instead of $16 to $40. Builders should also bear in mind that the plans shown in NATIONAL BUILDER, and especially designed for NATIONAL BUILDER, are merely samples of several hundred plans which The Architects' Small House Service Bureau has available at its regular prices.

NATIONAL BUILDER PRIZE CONTEST

I, THE EDITOR of National Builder, hereby agree to pay cash prizes for articles on the Use of The Architects' Small House Service Bureau designs and plans by National Builder subscribers in their own business as follows:

First Prize.....$250
Second Prize..... 125
Three Prizes of $50 Each
—a total of $525 in cash on or before August 1, 1923.

The details of this offer, and the reasons for it, are given in the accompanying article.

Nathan C. Rockwood

Editor, National Builder.
Chicago, Ill., Dec. 22, 1922.

Details of Prize Offer

Both to demonstrate and to test the saleability and the practicability of these special NATIONAL BUILDER plans, NATIONAL BUILDER will pay on or before August 1, 1923, cash prizes aggregating $525, as follows: First prize, $250; second, $125; and three $50 prizes. Any *bona fide* subscriber to NATIONAL BUILDER may enter this competition. The prizes will be paid for the best accounts of how NATIONAL BUILDER subscribers have made use of these special NATIONAL BUILDER plans in their own business. The article may describe how houses were built from these plans and sold; or how the plans and designs were used to sell the services of the contractor or builder to a client.

In judging the articles submitted, literary merit and style will count for little. What is wanted are hard-boiled facts about these plans and designs. Did the public buy them? Did you make changes in the plans or details, and why? What methods were used to finance the work? What did you do to advertise them, or your services? What constructive criticisms can you make of the plans, the designs or the details? What did the houses actually cost to build? How can these costs be reduced without detriment to the finished product? How did you merchandize the plans and designs? The houses? How can these house designs be improved or be made to serve your purpose better? What class of people takes to them? What class does not take to them, and why?

These are merely a few suggestive questions with which the competitor should approach his job of winning the prize. There are no fixed rules or regulations governing the make-up of the articles. Be natural. Write down your experience and suggestions and advice just as you would tell it to the editor face to face. The editor will decide, with whatever assistance may be needed, which story submitted contains the most useful and valuable information for the building industry to know, and the prizes will be awarded on that basis. Any article which does not win a prize but is considered of sufficient value to publish will be paid for at regular space rates. There is no limit set to the length of the articles. A 600-word article may win the $250 prize—but the article must give sufficient information to cover the subject adequately. Photographs, blueprints or pencil sketches may be submitted by way of illustrations.

The time limit is July 1, 1923. The results of the prize contest will be published in the annual Home and Housing number of NATIONAL BUILDER, out August 1, 1923.

How to Estimate the Paying Possibilities of Purchasers

By Frederick L. Ackerman, Architect

This Article, While Directed to the General Reader as it Originally Appeared in "The American Magazine," under the title, "The Home You Can Live in on Your Income," is Here Reproduced by Special Permission as of Interest and Convenience to Contractors, Builders and Architects, to Whom the Ability of the Client to Pay is of Even More Importance Than Securing the Job. There is Food for Discussion in Mr. Ackerman's Findings

THE accompanying table is necessarily based on broad averages. The size and the cost of a house that may be owned and kept up by a family with any specified income, depends on a great many circumstances: the size of the family, the cost of building in different sections, and the price of the lot, which varies according to locality. Even allowing for these variations, the table will be a valuable guide in solving the individual problem.

COLUMN 1: The basis from which you must reckon is your annual income.

COLUMN 2: It is generally assumed that one-fifth of your income may be spent for rent; or, if you own your home, for maintenance, taxes, insurance, interest on the investment—the amount it cost you to build or to buy it. But one-fifth is too large a proportion for the *lower* range of incomes. Government reports and other surveys show that families with small incomes cannot spend more than one-eighth of their income on rent.

The Department of Labor, in September, 1919, issued a report on 91 localities. It showed that families with an income of $1,200 a year paid an average rental of $174, or only about 7 per cent of the income. Those with $1,500 a year paid rentals which averaged 8.6 per cent of the income.

Another table, covering 45 cities, gives the rents paid by families of the same size—husband, wife and three children aged 2, 5, and 11 years. These families had the same *total* expenditure of $1,300 a year. The amount they paid for rent averaged $167, or 7.8 per cent of the total expenditure.

There are few figures available about families with larger incomes. But the proportion given here, one-fifth, is a reasonable allowance for rent, or for the annual expense of *owning* your home. This annual expense covers the cost of repairs, insurance, taxes, and interest on the amount invested.

If, however, you are not able to pay at once the cost of buying or building, and have to borrow money on a note or mortgage, this one-fifth does *not* cover any payments toward wiping out the note or mortgage. That must come out of your savings.

Remember this fact when you buy or build. If you have got to pay a note or mortgage *out of your income,* you must include these payments in the *annual cost* of your home for as long a period as it will take to pay off the debt.

COLUMN 3: The figures here are ten times the amounts in column 2; that is, the *annual* expense of owning a home is about one-tenth its cost. You may have the money in hand to build a $10,000 house. But are you going to be able to pay $1,000 a year for repairs, taxes, and so on? To do that, you should have an assured income of $5,000 a year.

Here, again, conditions vary. Taxes are higher in some places than in others. So are water rates. So is the cost of labor for painting and making repairs. Find out, *in*

Your income	Annual rent, or annual cost of your own house, will average one-fifth of your income	Average cost of house and lot per income	This share of the cost goes into the lot	This share of the cost goes into the house	Estimated size of house you can build, at a cost of 30 cents a cubic foot for the amounts given in column 5	Estimated size of house you can build, at 50 cents a cubic foot, which is the cost of the higher class of private homes
$1,000	$ 200	$2,000	$ 400	$1,600		
1,500	300	3,000	600	2,400		
2,000	400	4,000	800	3,200	A very small 3- or 4-room bungalow without cellar.	
2,500	500	5,000	1,000	4,000	18'x25'. Area, 450 sq. ft. A small 4-room house. Volume, 13,300 cu. ft.	
3,000	600	6,000	1,200	4,800	A 4- or 5-room house, 20'x27'. Area, 540 sq. ft. Volume, 16,000 cu. ft.	
3,500	700	7,000	1,400	5,600	A 5- or 6-room house, 20'x29'. Area, 580 sq. ft. Volume, 18,666 cu. ft.	A small 3- or 4-room bungalow without cellar.
4,000	800	8,000	1,600	6,400	A 6- or 7-room house, 20'x37'. Area, 740 sq. ft. Volume, 21,330 cu. ft.	A small 4-room house, 18'x25'. Area, 450 sq. ft. Volume, 12,800 cu. ft.
5,000	1,000	10,000	2,000	8,000	A 7- or 8-room house, 23'x40'. Area, 920 sq. ft. Volume, 26,650 cu. ft.	A 4- or 5-room house, 20'x27'. Area, 540 sq. ft. Volume, 16,000 cu. ft.
6,000	1,200	12,000	2,400	9,600	An 8- or 9-room house, 27'x40'. Area, 1,080 sq. ft. Volume, 32,000 cu. ft.	A 5- or 6-room house, 24'x28'. Area, 672 sq. ft. Volume, 19,200 cu. ft.
8,000	1,600	16,000	3,200	12,800	A 9- or 10-room house, 34'x40'. Area, 1,360 sq. ft. Volume, 42,660 cu. ft.	A 7-room house, 25'x32'. Area, 800 sq. ft. Volume, 25,600 cu. ft.
10,000	2,000	20,000	4,000	16,000	A 10- or 11-room house, 30'x58'. Area, 1,740 sq. ft. Volume, 53,000 cu. ft.	An 8-room house, 30'x35'. Area, 1,050 sq. ft. Volume, 32,000 cu. ft.
12,000	2,400	24,000	4,800	19,200	An 11- or 12-room house, 30'x65'. Area, 1,950 sq. ft. Volume, 64,000 cu. ft.	A 9-room house, 30'x40'. Area, 1,200 sq. ft. Volume, 38,400 cu. ft.
15,000	3,000	30,000	6,000	24,000		A 10- or 11-room house, 30'x50'. Area, 1,500 sq. ft. Volume, 48,000 cu. ft.
20,000	4,000	40,000	8,000	32,000		An 11-, 12-, or 13-room house, 33'x60'. Area, 1,980 sq. ft. Volume, 64,000 cu. ft.

Study this table and read carefully the notes explaining it

advance, how much your house will cost you *each year,* and then you will know what kind of a house you can afford to own. The figures in column 3, therefore, must always be considered with reference to those in the previous columns. Someone may have left you a legacy of $10,000; but you should not put it all into a house—unless you have an *income* to match.

COLUMN 4: This is necessarily a rough estimate. In small towns the lot may cost less. In cities it would cost more. The figures given here are the assumed cost of the land and the *public improvements*—sewers, road paving, sidewalks, street connections for water, gas, electricity.

If you buy a lot where these improvements have not been made, you will have to stand the additional expense later, when they are put in. The cost of these "public improvements" will be greater than the cost of the bare land. This is a vital point to be remembered. You will have no choice; but will be compelled to pay your share for the street paving, water supply, sewage disposal, and so on.

COLUMN 5: This item is simply the total investment you can make, minus the cost of the lot.

COLUMNS 6 AND 7: Costs of building vary greatly, depending on local conditions. They are abnormally high everywhere at present. They probably will continue to be high for at least several years. Very simple houses, such as are built for "industrial housing" developments, cost about 30 cents a cubic foot, *if built in quantity.* Private individuals may be able to build at that rate in certain localities where low building costs prevail, but not otherwise.

A "bungalow" type is specified in two instances, because the bungalow does away with certain items of expense, such as stairs.

Moderate-sized houses of a good, substantial character, *specially designed, built singly, near or adjacent to large centers of population,* cost around 50 cents per cubic foot at the present time. Still larger or more elaborate houses of special finish and costly materials, range all the way from 50 cents to one dollar per cubic foot at the present time.

COLUMN 6 indicates how large a house may be had for the price specified—*provided* the house is of a simple character or built in a locality where the cost of building is exceptionally low.

The size of the house is given in cubic feet, and by the approximate outside dimensions of the ground floor (for a two-story house). The *number of rooms* ordinarily found in houses of such volume and area is also stated. It should be kept clearly in mind that the items in column 6 are based upon an assumed cost of 30 cents per cubic foot.

COLUMN 7: Fifty cents per cubic foot *is the present (1921) average cost of the typical house, built singly, in or adjacent to our larger centers of population.*

It should be obvious that, as a rule, the building of a home is at present *impossible* for those with very small incomes. This explains the blank spaces *opposite small incomes.* On the other hand, it is not likely that families with incomes of $10,000 or more would build the class of houses possible for 30 cents a cubic foot. This accounts for the blank spaces at the lower end of column 6.

In counting the number of rooms in a house, the figures set down include kitchen, living, and sleeping rooms. Bathrooms, pantries and halls are not counted as "rooms" in this tabulation. It is assumed that houses of three, four, and five rooms would contain neither hall nor pantry, but would be provided with one bathroom. Houses of six or seven rooms might contain a small hall, one bathroom, but no pantry. Houses of eight or more rooms would contain hall, pantry and one or two baths, depending upon the number of bedrooms.

Whether there be one room more or less, in the numbers given here, depends upon the *size* of the rooms. The dimensions of the ground floor, or the volume of the house, is a much better guide in making comparisons than the number of rooms.

Amortization Table

Approved by Federal Farm Loan Board

A loan of $1.000 at 5½% interest repayable in 34½ years by means of semi-annual installments of $32.50, which includes the interest and part of the principal.

SEMI-ANNUAL INSTALLMENTS				SEMI-ANNUAL INSTALLMENTS			
No.	Appl'd on Interest	Appl'd on Principal	Balance Due	No.	Appl'd on Interest	Appl'd on Principal	Balance Due
1	$27 50	$ 5 00	$995 00	36	$19 58	$12.92	$699.00
2	27 36	5 14	989 86	37	19.22	13.28	685 72
3	27 22	5 28	984 58	38	18.86	13.64	672 08
4	27 08	5 42	979.16	39	18.48	14 02	658 06
5	26 93	5 57	973 59	40	18.10	14.40	643 66
6	26 77	5 73	967.86	41	17.70	14.80	628.86
7	26 62	5 88	961 98	42	17.29	15 21	613 65
8	26 45	6.05	955 93	43	16.88	15 62	598 03
9	26 29	6 21	949 72	44	16.44	16 06	581.97
10	26 12	6.38	943 34	45	16.01	16 49	565 48
11	25 94	6 56	936.78	46	15 55	16 95	548.53
12	25 76	6.74	930 04	47	15.08	17.42	531.11
13	25 58	6 92	923.12	48	14.61	17 89	513 22
14	25 38	7.12	916 00	49	14.11	18 39	494 83
15	25 19	7 31	908 69	50	13.61	18.89	475.94
16	24 99	7.51	901.18	51	13.09	19.41	456 53
17	24 78	7.72	893.46	52	12.56	19.94	436 59
18	24.57	7.93	885.53	53	12.01	20 49	416 10
19	24 35	8.15	877 38	54	11.44	21.06	395.04
20	24 13	8.37	869 01	55	10.86	21.64	373.40
21	23 90	8.60	860.41	56	10.27	22 23	351.17
22	23 66	8.84	851.57	57	9.66	22 84	328.33
23	23 42	9.08	842 49	58	9.03	23.47	304 86
24	23 17	9.33	833.16	59	8 38	24 12	280.74
25	22 91	9.59	823 57	60	7.72	24 78	255 96
26	22 65	9 85	813.72	61	7.04	25 46	230 50
27	22 37	10.13	803.59	62	6.34	26 16	204 34
28	22 10	10 40	793.19	63	5.62	26 88	177 46
29	21.81	10.69	782 50	64	4.88	27.62	149 84
30	21.52	10.98	771.52	65	4.12	28 38	121 46
31	21 22	11.28	760.24	66	3.34	29 16	92 30
32	20 91	11.59	748 65	67	2.54	29 96	62 34
33	20 59	11.91	736.74	68	1.71	30 79	31 55
34	20.26	12 24	724.50	69	.87	31 55	
35	19 92	12 58	711 92				

The principle of amortizing loans and how it works out is expressed in this table, which will be found convenient in explaining the process and from which tables at other rates may be compiled.

What Is a Fair Recompense?

THE contractor who does not realize that he should be recompensed, not only for the investment of capital, but that his skill, experience and executive ability is of direct service to the owner and that for such services he should be paid a fair sum, fails to adequately size up the situation.

The Department of Better Business Methods of the Cleveland Builders' Exchange has devoted study to the subject, and its utterance is worthy of careful perusal. The department says:

The man who makes an investment in a partnership does so usually because he desires to invest his time as well as his capital. He expects, therefore, to receive not only a fair rate of interest on his money but also pay for his services, without which the enterprise could not be considered as profitable. An investor in a partnership, because of the element of risk in comparison with that of so-called absolutely safe investments, requires a higher rate of return under the title, interest, than he would in an ordinary investment in good securities. In other words, the amount of profit accruing from the operation of the business, aside from the salaries paid, if on a nominal basis, should exceed that of the interest paid on ordinary investments.

Single proprietorship or partnership profits or the net profits of either or both are easier of definition by a statement of what should not be considered in their determination, than by attempting to give an itemized list of the income and expense items entering therein. In speaking of profits in this way, the term is used in a technical accounting sense and not in the sense looked upon by the average contractor who fails to recognize the difference between gross and net profit. Net profit properly defined, is the profit determined before interest on the owners' capital invested and the recompense of the individual or partners on account of time and services are taken into account.

The legitimate reward of business is profit. In fact, commercial activity that is unprofitable is not business. The man who is responsible for unprofitable conditions of business is a menace to the community and to the state. He destroys the basis of credit and adds to the risk of the creditor whose confidence he abuses; he injures the business of his competitor who is striving to conduct his business on sound principles; he injures his government by curtailing its sources of revenue and nullifying its efforts for welfare and prosperity of its people; but most of all, he injures himself.

The fabric of humanity is so closely interwoven that the failure of one individual to recognize his responsibilities affects adversely the welfare of hundreds and often thousands of others.

Common Defects in Ordinary Building Construction

Why Structural Engineers Should Be Consulted in Their Design

By Edward Godfrey

THERE are professions so organized that the services of the members of the profession are forced on the public, whether the public wishes the services or not. Professional engineers have never busied themselves with the matter of forcing unwilling clients to employ them. The various state laws for the registering of engineers are not the work of professional engineering societies and are uniformly considered an annoyance and a useless burden by such engineers.

This article is not an effort to urge compulsory employment of engineers, but it does aim to show that the employment of a structural engineer on any structure of importance is an economic necessity. We have insurance against fire and no matter how careless a tenant may be in the handling of inflammables, the insurance companies generally have to pay. The only insurance against the collapse of a building from structural weakness is that which results from proper design, proper materials and proper execution of the construction.

Without belittling the importance of the other two it can be truly said that if the design is not proper, the possibilities of disaster are immensely greater than could be imagined with the most careless manipulation and the poorest materials that any contractor would dare to employ. I say this deliberately. Great structures have collapsed in utter ruin; uniformly the cause has been a bad design (or improper planning of the erection which is also designer's work). I could name 40 large structural failures and point out in each one the fundamental error in design that was responsible for the failure. It is true that poor materials and poor workmanship have figured as contributing causes in many of these, but the extent of the disaster could never have resulted from any other principal cause than improper design.

I have always advocated the formulation of rules of design—the elimination of judgment wherever it can be done. Judgment is good and proper and necessary, especially where there is no good rule that has application, and such occasions are very frequent and will always be sufficiently numerous to require the services of an engineer in structural designing. But judgment should be reserved for the things that are not covered by rules of design.

Need for Elimination of Individual Judgment

1—It should not be left to the judgment of the individual designer what unit stresses may be used for structural materials.

2—It should not be left to the judgment of an owner of the patent on a special system of design to selection of the moments or stresses that may be assumed in the parts of that design, even though those moments and stresses seem to have the support of privately made and privately interpreted tests.

3—It should not be left to the judgment of the individual designer to supply or omit details adequate to the stresses in the members of a structure.

A whole article could be written on each of the above three items.

Under 1 it may be pointed out that stresses on wood of the same grade, as used by different designers, run all the way from 800 to 1800 lbs. per sq. in. Published examples of stress used in steel rods in reinforced concrete run as high as 32,000 lbs. per sq. in., and down to about a third of this.

Under 2, any designer familiar with the literature on "systems" will recall or be able to cite examples of unscientific claims based on still more unscientific and improperly interpreted tests.

Under 3, a volume could be written. It would seem superfluous to say that details should be adequate to take the stress of the members, but it is just here that more violations of engineering principles and common sense are perpetrated than in all other lines of structural engineering combined.

Errors I Have Seen Made

It would be easy for me to build up a fabric of supposed engineering errors to write to myself. But every case I shall cite is actually work I have seen. Many of these jobs have had the check that city building inspection departments give. It would not be fair to name the structure unless it is already a matter of published information.

On one occasion I wrote up the description of 22 classes of errors in details in one set of drawings, some of them very grievous. The editor asked for the detail drawings, seemingly to check up on the facts in the matter, for he did not use them. I sent the prints, with titles cut out. He published the article.

My experience has included the following: Making and checking of designs of buildings and bridges in steel and reinforced concrete to the number of hundreds; inspecting and testing existing structures, such as bridges, buildings, tanks, a hundred or more. Incidentally I have taught in an engineering college. I have been drawn up the side (inside and outside) of many high standpipes, climbed up and down steel towers as high as 200 ft., waded in 18 in. of mud in the bottom of a tank, hung on a suspended ladder over water 30 ft. deep to measure and inspect steel work and sat in the witness chair by the hour while lawyers wrangled over the admission of "the professor's" testimony as an expert. I relate this experience to give the reader a basis for judgment as to the value of this contribution.

Limiting Value of Handbook Standards

There are two phases of designing. One is the routine phase—seeing that beams and columns and tension and compression members meet the requirements of the specifications and that standard end connections are used on beams. These things are standardized. Handbooks tell the designer just what to do. Certain loads require certain beams when the beams have certain spans and spaces. Columns of given height have standard capacity loads. It is well that these standards exist; they lessen the chances of error. Danger in building construction does not consist in following these standards, but it does consist in the idea that one is apt to acquire that if these standards be followed, a proper engineering structure results.

The other phase of designing is one that requires study of the special features of the case that do not come in the "automatic" class. It is neglect of this phase of designing that gives rise to all structural steel failures. In reinforced concrete I do not hesitate to say that the standards of

design are largely at fault, and these will never be safe until engineers recognize that stirrups and short shear members do not prevent shear failures, and vertical rods near the corners of a concrete shaft do not make a proper column.

Values for column loads in handbook tables are on the assumption that columns are centrally loaded or that the load is balanced. Many designs violate good engineering because the tabular load is used for the columns when the load on the columns is quite eccentric or unbalanced.

Tabular values for beams are on the assumption that the beams are straight. Many designs err because curved beams are used in the same manner in which straight beams are used.

Standard end connections of beams are designed to carry the end reactions of the several beams as a simple vertical shear and are not designed to take cantilever stresses. Many designs are faulty because ordinary beam connections are required to take cantilever stresses.

*Knickerbocker Theatre Failure**

The Knickerbocker theatre was weak in every different type of design employed, but had it been of ample strength in the roof slabs, the roof beams, the columns and the main roof truss, with the support of the main roof truss allowed to remain as it was, the collapse would have occurred just as it did. In other words, the routine phase of the design could have been ample and still disaster would have resulted.

This truss was supported on a high wall, built up of an outer facing of brick and an inner shell of tile laid with the cells vertical, laid without any practicable opportunity of making good mortar joints. It is probable that the inner shell yielded, and the resulting slope in the support allowed the truss to slide off. Or the truss, which met the wall at an angle of nearly 45 degrees, by successive cycles of expansion and contraction, simply worked off the seat laterally, as illustrated in Fig. 1.

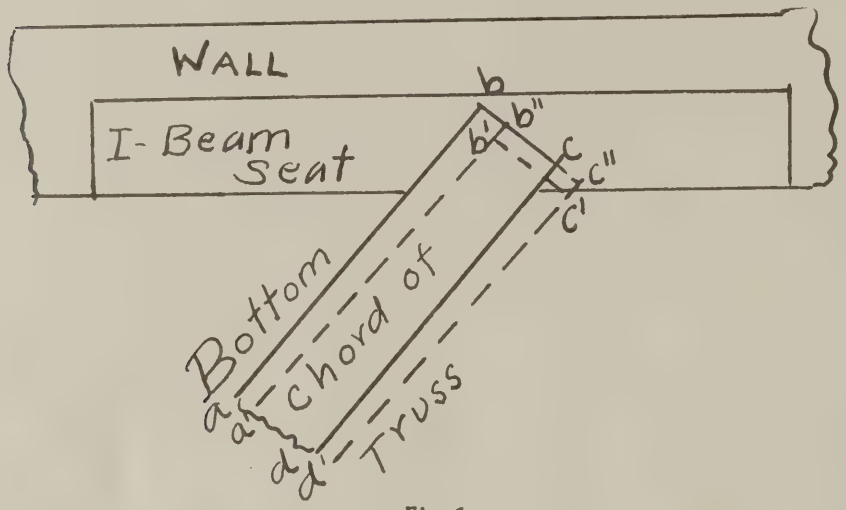


Fig. 1

If the original position of the truss (in plan) were a, b, c, d, it would be a', b', c', d', after the first contraction. When expansion occurred, the truss would not climb back to b, c, but would slide laterally to the b'' c'' position, following the path of least resistance. Thus it would gradually work off the wall support until finally with one last kick the long curved wall was pushed out and broken, and the entire roof collapsed with the main supporting truss. There was no anchorage nor strut at the end of the bottom chord of the truss, and it was not attached to the ceiling, so that the progress of the failure was not observed

An engineer, examining the design of this building, would have seen to it that all parts were made in accordance with the rules of good practice. He would also have seen to it that the main truss was properly supported. If his examination had been made after the building was erected, he would have ordered the building closed until adequate truss support were provided and sufficient load bearing capacity supplied for a reasonable snow load.

Other Examples of Faulty Design

The Majestic theatre in Pittsburgh was an old remodeled church. A ceiling was introduced between the bottom chords of the old wooden roof trusses. The ceiling joists were ample, their end supports were ample, the routine phase of the design was taken care of but the end wall was bulging and weak. This wall, in its bulging condition, was reinforced by a long channel, with web horizontal, curved to fit the wall, the channel being anchored at the ends into the wall itself.

Engineering judgment would have dictated a new wall. Also engineering judgment would have perceived the progress of failure when the end wall showed unmistakable signs of continued bulging. An engineer, examining this building before a large section of the ceiling dropped on the seats and smashed them to splinters, while seats just behind these were occupied by spectators, would have dropped his book of tables and rules and devoted his attention to the serious problem presented. He would have seen to it that measures were taken at once to avert the calamity. A description of this building and the cause of the ceiling collapse will be found in *Engineering News-Record,* May 25, 1922.

Double-Shell Wall Failure

A school building was being constructed with bearing walls consisting of outer shells of hard face brick, non-absorbent, with thin mortar joints. The inner shells were absorbent bricks with thick mortar joints and tile, also with thick mortar joints. When the load came on these walls, one of them buckled out very badly, because the inner shell yielded, and the outer shell received the load, which it was too thin and high to take.

Another wall collapsed, dropping a large portion of the floor, which was reinforced concrete. Reinforced concrete was wrongly blamed for the failure until a test was made on similar floor construction. The test proved that the routine phase of the design had been at least approximately correct. But engineering examination revealed the fact that two ones do not always make two. One pint of oil and one pint of water do not make a quart of anything; it will always be two separate pints. A rigid element and a yielding element will be two separate things and not a unified support for carrying loads.

Economy of Good Design

A large school building was under roof. The steel roof beams were weak, steel columns were weak, reinforced concrete columns were weak, some reinforced-concrete beams showed stresses up to the ultimate strength, walls were inadequate. These are the things discovered by an engineer who was called in. Without disturbing any finished construction, these faults were all remedied.

In this case routine designing was deficient to the extent that there might have been a disastrous failure. The designing that means a special problem of each structure was also lacking. If this design had been given to an engineer to check before construction was begun, instead of the practice being followed of farming out the designing to concerns who supplied the materials, all of these errors would have been avoided.

It does not require any special pleading to demonstrate the economy of taking care of such matters before work is begun, even when the errors are caught before the work is finished. The expense and anguish that might have resulted had collapse occurred after its completion might have

*See National Builder for March, 1922.

been very great. No sum of money could compensate for the loss of children's lives that might have been sacrificed to a practice that ignores the expert to save his paltry fee of a few hundred dollars.

Inadequate Foundations

A large hospital building was designed by an architect. He employed an engineer to design the beam and column work and the column foundations. For the wall foundations he obtained from the engineer the running load on the footings for the exterior walls, which were bearing walls, but he did not consult the engineer as to the size of footings necessary to carry those loads on the soil. The building was constructed on footings for the bearing walls that were about half as wide as they should have been. The footings sank under their loads, and large parts of the exterior walls had to be rebuilt. The architect's professional career, a promising one, was ended by this occurrence.

Mix Common Sense with Mathematics

The Orpheum theatre in New York collapsed, just after about 200 workmen left at quitting time. About a year later expert reports were finally completed and published, including tests of material of a "bystanding" and innocent girder on which the greater part of the heavy roof fell, causing a splice plate to break short. Also later an expert with a secondary stress theory from the other side of the Atlantic ocean told the alleged cause. Five minutes cursory examination of the plans was enough to tell without a scintilla of a doubt exactly what made the structure collapse. An enormous curved girder, with a 72-ft. span and a 12-ft. versedsine (projection from the line of the supports), connected at the ends to slender columns, was the complete explanation. This explanation was not given in any of the "expert" reports. I called public attention to it in *Engineering and Contracting*, February 18, 1914.

Building Laws Do Not Insure Safe Design

In the first part of this paper I hinted that the examination given by building inspection departments is not a guarantee of the safety of buildings. In the nature of things, it is routine—an examination to see that certain rules of design or laws are carried out. If carefully made, the examiner will see to it that his examination eliminates any skinning in the design. But a design does not need to be skinned for the structure to fail. One blunder in stability, or equilibrium, or bracing, or details may be enough to bring down the whole structure. Sometimes, if the law "leans backward" the department will ignore it and substitute judgment. Here is the best example I know of the need of a more liberal law and a more rigid application of that law—the elimination of judgment.

In a certain large city the law requires that high buildings be designed for wind loads that increase, in the upper stories, to 35 lbs. per sq. ft. I was checking a 20-story building in that city. Common practice and the design of the building convinced me that it was out of the question to provide, in the columns of this building, particularly the first-story columns, resistance enough in the steel work to bring the stresses down to anything like those allowed by the building code. I endeavored to find out from the building department if they had any rule of practice whereby part of the wind load could be assumed as carried by the general stiffness of the walls and partitions, but I was informed that they had no such rule and that the steel work alone must resist the wind. Then I asked the designer for his method of figuring the wind moments in the columns. I was supplied with calculations showing by an elaborate system the distribution of moments among the columns. I saw at once that the columns as designed were subject to stresses greatly exceeding those allowed by the code by these moments.

The building department had already passed the plans. On my part I was willing to ignore a large fraction of the wind load. Also I was willing to brush the elaborate system of the moment distribution aside and take the average for the moment on the whole set of columns—even to apportion to the heavier columns greater shear and moment—to take advantage of every pound of steel already in the columns, in spite of high theory. But I was not satisfied with the design of the columns.

A conference of engineers was called. I pointed out that the design moments in the columns were not take care of in the design as it existed. The answer was that the average moment should be used. I said, "All right, I will accept the average. Still the moments are high." But they said, "The depth for moments is not the full story height, as shown, but the clear height." "All right," I said, "take the clear height. Still the moments give excessive column stresses." "But," they said, "column stresses are not to be taken here; the stresses are at the ends of columns." "These are too high," I said. "Yes," they said, "but do you not allow 50 per cent excess instead of the code 30 per cent for wind?" I agreed to accept the design if 60 tons of steel were added to the columns, not to make it come up to the absurd building law, but to supply the rigidity commensurate with the demands of good construction.

The building law just referred to gives an opportunity for the grossest kind of injustice. The execution of this law is entirely arbitrary. No engineer could have maintained that that building as designed met the law. Hence a building inspector could force prohibitive design on a builder, if for any reason he did not want to pass the plans. I will not follow this lead any further by citing the examples.

In the case of the city code referred to, it would be sufficient and sound engineering if the law provided that one-half of that wind load (which is very high for large surfaces) should be provided for solely in the steel work with unit stresses not to exceed about 14,000 lbs., dividing the bending moment among the columns in proportion to the ability to resist it. Two designers on different sides of the world would then get substantially identical results. As it is now, no two designers could possibly arrive at similar results unless it was by accident.

Fungus on Untreated Timbers

THE U. S. Forest Service issues the photograph here reproduced showing the strange forms of the fungi which attacks mine timbers, causing a loss to mine owners of millions of dollars annually for timber

Fungus growths on timber

replacement. The grotesque shapes are fruiting bodies, whose incubation and growth is preventable by treating the timbers with a good preservative.

Staining Interior Woodwork

By Albert Brace

STAINS, as applied to wood finishing, fall into two general classifications: liquid and powder or dry form. Under liquid may be listed four types: penetrating oil stains, spirit stains, acid or water stains and pigment stains. Under dry stains come three types: the water solubles, the oil solubles and the spirit or alcohol solubles. Each of these, with the exception of the pigment stains, has its place of usefulness in the modern practice of bringing out and beautifying the figure of the various woods. Because they are the type most extensively used in building work, we will leave the penetrating oil stains to the last for wider treatment, taking up the others briefly and in the order shown above.

Spirit Stains

These are basic aniline dyes dissolved in alcohol and are employed chiefly for touching up spots which have been worn to the wood, and where it is not desired for some reason to clean and refinish all over. They dry almost instantly and will penetrate through varnish, something an oil or water stain will not do. However, except in the very dark shades and black they are not generally used, as they are fugitive to light, that is fade rapidly when exposed to the sun.

Acid or Water Stains

Anilines dissolved in water—so many ounces to the gallon, according to depth of color desired—they undoubtedly give the fastest, that is to say, the most permanent color to wood. Used almost to the exclusion of other types of stain in finishing fine furniture, they involve one disadvantage so far as building woodwork is concerned.

No matter how carefully the wood may previously have been prepared, water stains when brushed on have the almost immediate effect of raising the grain. The tiny wood fibres which as a consequence stick up must again be sanded down before proceeding and on large work this extra labor expense is a considerable factor. Nonetheless, in cases where window casements and doors are to be stained red or green their employment is essential for the reason that they are impervious to sunlight. An oil or spirit stain of the same colors would under the same conditions soon fade out to a sickly brown or gray and necessitate doing the work over. Under present conditions, however, this is not generally a serious consideration for the reason that brown mahoganies, walnuts and enamel seem to have the field to themselves. In many apartments today may be seen the sad results of trying to meet the earlier vogue of red mahogany by using oil reds where sunlight had access to the wood even occasionally.

While oak has practically passed so far as woodwork is concerned and even in the old days was unusually "golden," there were and still are occasional calls for a fumed effect. Here an acid stain has a strong demand, for it supplants the slow and cumbersome fuming box (for furniture) and gives a variety of good fumed effects.

The wood is first treated with a water solution or "toner" of soluble acids. This does not really color the wood, but assures a uniform finish when the fumed-oak acid stain itself is applied later. There are also fumed-oak penetrating oil stains on the market which stain in one application but have a tendency to dull the flake of "quarter sawed" rather than bring it out.

Pigment Stains

These are a relic of the old days before anilines for the dyeing of wood had reached their present state of perfection. They represent the cheapest and least beautiful treatments for wood in that they are opaque earth colors such as umbers, siennas, lakes, etc., dissolved in oil to approximate oak, walnut and mahogany colors. They have a field of usefulness in varnish stains, or, more properly, colored varnishes, where they are present in whole or in part combination with anilines to give body and covering quality. They obscure, however, rather than beautify the figure of bare wood.

Dry Stains

Whether water, oil or alcohol soluble, these are merely the dry aniline coloring matter which provides color to the various liquids. They are, in a word, the stains minus the liquid and are frequently called for in this form by practical users who desire to mix their own shades. This is particularly true in the furniture field where exclusive effects are sought and formulas composed of varying proportions of different stain powders and liquids are jealously guarded by the originators.

So far as finishing in building work is concerned, they are of little interest save in the water-soluble types of red mahogany and possibly green. Here it is cheaper for the painter to purchase the dry form rather than the ready-mixed "acid," as in the latter case he appears to be purchasing an unnecessary quantity of water. The dry reds or greens can be mixed on the job from formulas printed on the container where these colors are to be used. (See under Acid Stains.) These dry anilines are very strong, whether soluble in water, oil or spirit. The second named is best bought ready mixed unless a very special color is to be matched and for the alcohol solubles there is little building use as pointed out under "Spirit Stains."

Penetrating Oil Stains

"Oil stains" alone would be an ample description, but custom has adopted the prefix "penetrating," originally to impress the user with the difference from the old pigment stains which lay on the surface and had to be wiped, almost rubbed, into the wood.

The most generally used of all stain types for wood finishing, they consist, with modifications, of oil soluble aniline powders dissolved with the acid of heat, in benzole. Take, for example, a popular shade of mahogany, which is a composition of red, yellow, black, scarlet and orange. Put in solution with benzole it is treated by the addition of other chemicals such as naptha, xylol, certain acids and solvents together with a portion of asphaltum. Each serves a purpose of holding the color, adding penetration, ease of brushing, spreading, keeping in solution, and so forth.

Unlike water-stains, penetrating oil-stains do not raise the grain of the wood, thus eliminating the expensive sanding operation. Unlike spirit stains, they do not show laps when brushed and are not fugitive as to color. In time direct sunlight will bring about slight fading (in the reds and greens radically), but for interior woodwork this contingency is not serious.

Varnish should never be applied directly over a penetrating oil stain; a coat of shellac or shellac substitute should first be applied in order to prevent the stain "bleeding" through the varnish. Moreover, no matter how many coats of varnish are used they will not dry without the shellac in between to prevent affiliation between the oil of the stain and that in the varnish.

Similarly with wood filler, a wash coat of shellac should be used over the stain before filling when the wood is open grained. This insures a cleaner finish and keeps the wood filler, with its linseed oil base, from wiping up the oil stain. In any event after an oil stain has penetrated it is well to wipe off lightly with a rag, as it insures a more even tone to the finish color.

The demand today for interior wood finishing, leaving enamel out of consideration, is for brown mahoganies and walnut, the old red shade of mahogany hanging on only for colonial effects—that is, on handrails and treads with white enamel on spindles and risers.

Antique mahogany is usually applied to birch and walnut to gum, with a coat of shellac and one or two coats of flat varnish to give a dull satiny waxed effect. This is in keeping with the styles in furniture which

have followed this trend for some time, with plain tone rugs, and bright colors developed only in drapes, cushions, lampshades, etc.

Golden oak, once so popular, has gone the way of shiny tile in entrance and fireplaces. Marble for furniture tops and fireplace mantels, long in oblivion, appears to have completed the cycle and is giving signs of a return to favor; the same is true of our old friend birdseye maple in furniture. Propaganda is responsible for some of these resurrections, fickle public favor for others.

Interior woodwork finish in all classes will sooner or later be affected by these changes—how or when or whether new shades of stain will have to be concocted we do not yet know.

Modern Sanitary Poultry House

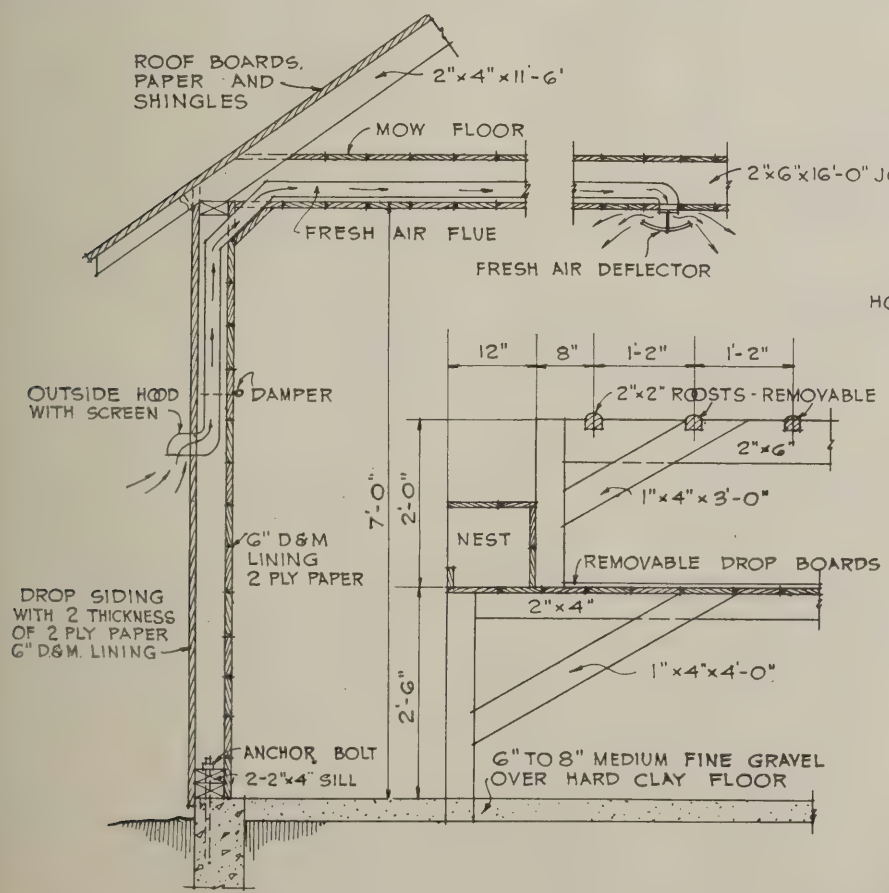
By R. S. Ekholm

THE man who "builds for the hen" should study the requirements of the hen, just as he studies the requirements of the human biped. The hen on the average farm has been a sadly neglected creature in many ways, and the reason for this is very clear. A hen in one sense of the word is self-supporting, for if no one will help her, she helps herself. There is never a sign of complaint on what she gets to eat or where she has to sleep, but will roost in a tree, the machine shed, or sleep with the cows or hogs.

But why treat her in this manner, when if given a chance she becomes the biggest money-maker on the farm, but if neglected, she requires all her strength and energy to take care of herself, and therefore produces very little. Chickens, as well as any domestic animal, require a warm, well ventilated house with plenty of light and room. The plan shown here provides for just that very house, and is not only handy for the hen but likewise convenient and handy for the caretaker as well.

This hen house is not only for the large farm, but for the smallest general farm to the largest farm for poultry only, as it is built in sections of 16 ft. wide by 20 ft. long, and as many of these sections can be built as are required. Each section will house from 90 to 100 full grown hens, allowing 3 sq. ft. of floor space and 20 cu. ft. per hen. The available floor space reaches from wall to wall, as there are no nests or roosts along the wall, allowing the use of the entire floor for scratching and feeding. The floor is made by excavating about 18 in. and filling in with 6 in. of cinders, 4 in. of good clay, 6 to 8 in. of medium fine gravel and a bedding of straw. This bedding should be cleaned out at least once a year. A floor of this kind is dry and sanitary in summer and warm in winter, as frost is kept out of the floor.

The nests are 30 in. from the floor and placed on the two long sides out of the way for the roosts, but very convenient for the caretaker, as one trip around this room is all that is required to collect the eggs. Trap nest fronts can be attached to these nests if required. The roosts are 24 in. above this table and are spaced 14 in. apart. They are made of a 2x2-in. square with the top corners rounded off and set in slots out in 2x6-in. stringers, allowing them to be removed. All roosts are 2½ ft. from the ceiling where the warm air which naturally rises is found, and they are all the same level, which allows the fouls to spread out



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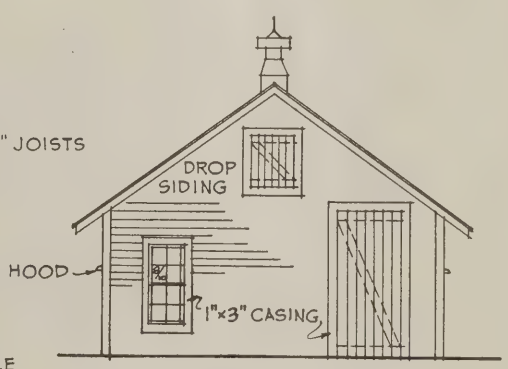
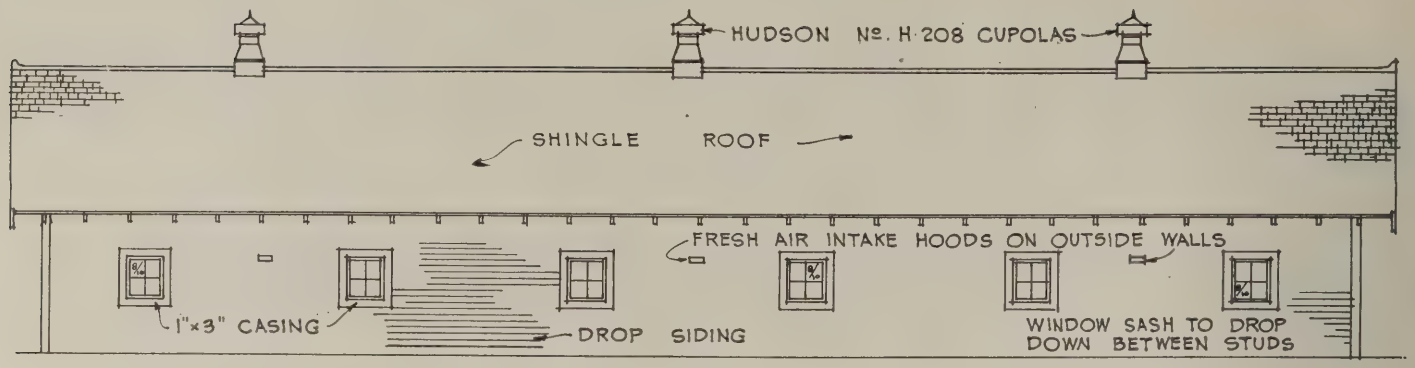
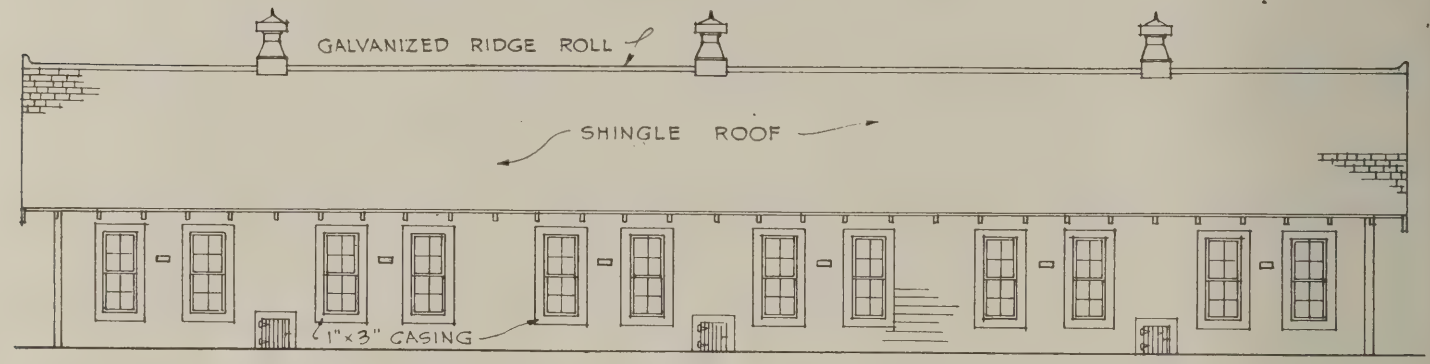


· WEST · END · ELEVATION ·

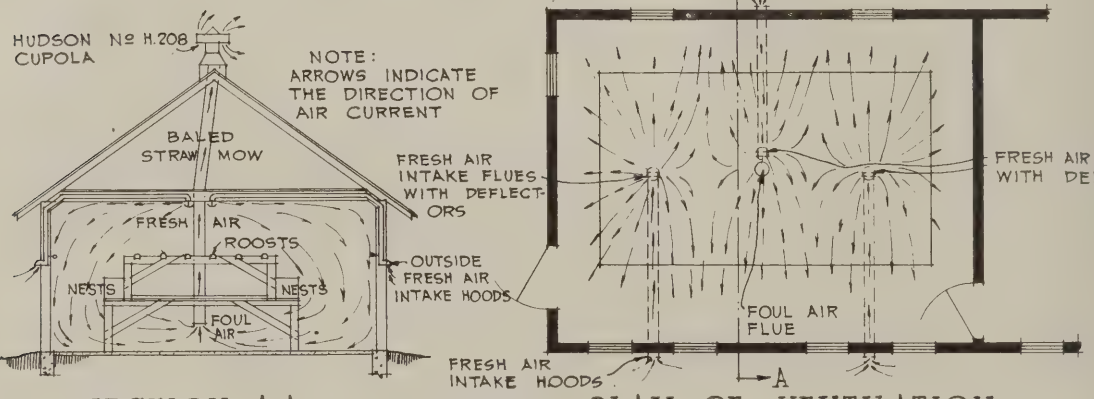
· EAST · END · ELEVATION ·


HUDSON No. H 208 CUPOLAS
SHINGLE ROOF
FRESH AIR INTAKE HOODS ON OUTSIDE WALLS
1"×3" CASING
DROP SIDING
WINDOW SASH TO DROP DOWN BETWEEN STUDS

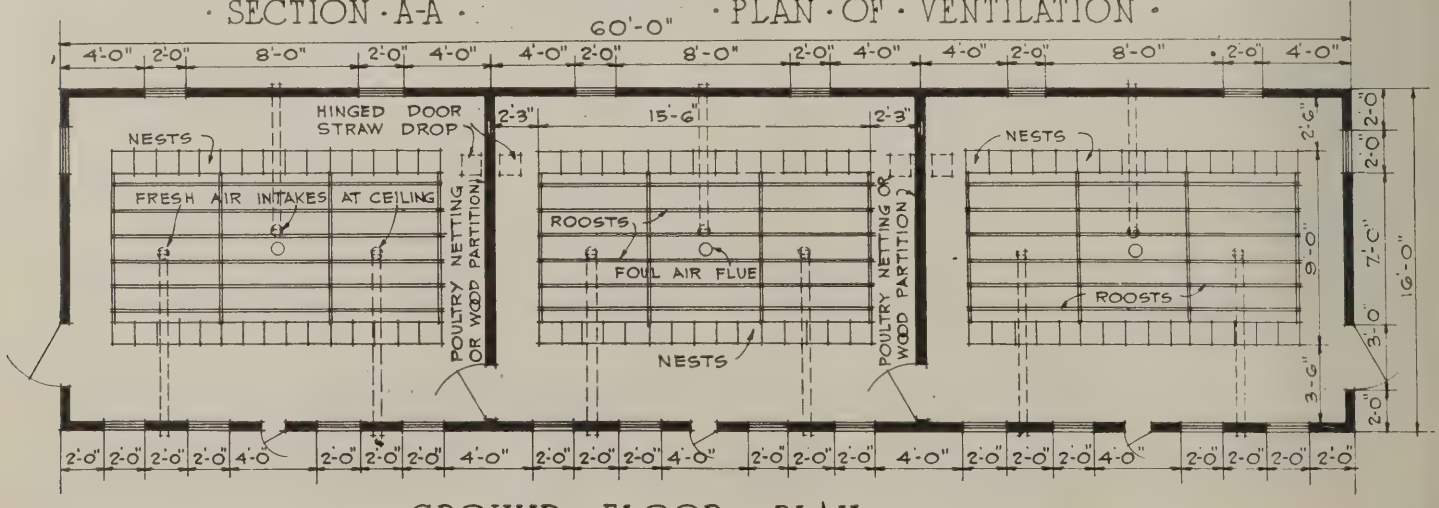
· NORTH · SIDE · ELEVATION ·



· SOUTH · SIDE · ELEVATION ·



· SECTION · A-A · · PLAN · OF · VENTILATION ·



· GROUND · FLOOR · PLAN ·

over all the roost in place of all of them climbing to the top roost as is generally customary where one roost is higher than another. The drop boards are made in sections.

Three arrows shown on the cross section AA, and on the plan of ventilation show how the fresh air is taken in on the two sides, one-third opening from the cold north side and two-thirds from the south side. These fresh-air hoods are furnished with a bird-proof screen and damper. The air is carried up the wall and across between the joists to the center of the room. Here it is admitted through the ceiling where a deflector distributes the air in all directions along the ceiling. The air can not go directly down to the floor, but must travel out to the four walls and then down and back under the table to the foul air flue which extends down through the table and 16 in. from the floor. This movement of air along the walls tends to keep all frost out and dry the floor, besides furnishing a constant change of air. The foul air flue is covered with ¾-in. flaxlinum in the straw mow to keep from sweating and is run up into a Hudson No. H-208 cupola.

In a climate where the temperature is liable to go as low as 30 or 40 deg. below zero, it is good policy to make a hen house as warm as possible; therefore, we show a 2x4-in. studding wall with 6-in. D & M, two thicknesses of 2-ply paper and drop siding on the outside, and one thickness of 2-ply paper with 6-in. D & M lining on the inside. The straw mow floor should be covered with loose straw in cold weather and the two small end doors left open in warm weather, which will effectively ventilate the mow in the summer.

The windows are made to fit between the studding at 2-in. O. C., but the studding should be doubled at all window and door openings and at all four corners. The northern windows are single sash, 4 lights 8x10 in. and the sash is made to drop down between the studs when open. The south windows are 2 sash, 4 lights, 8x10 in., raise and lower windows and can be installed with weights on spring stops. All windows can be fitted with storm windows on the outside and with screens hinged on the inside if required. Small hinged doors in the mow floor allow a means of dropping down straw to be used as bedding.

A Cheerful Farm Home

By D. Williamson, Farm Architect, in the "Pennsylvania Farmer"

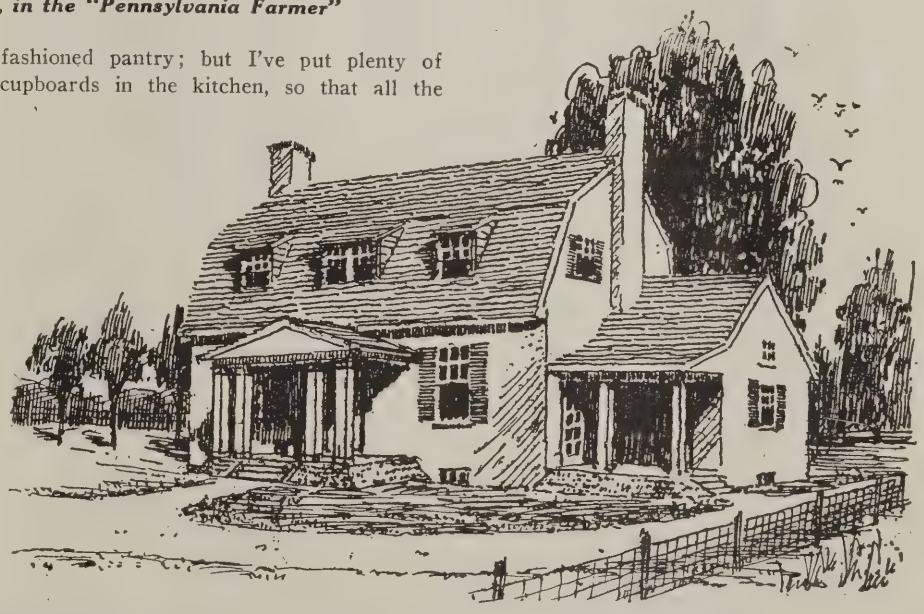
THE most important part of a farmhouse is, of course, the kitchen. The farmer's wife spends probably three-fourths of her working hours in this room; yet too often it is ill-arranged, ill-lighted, and ill-ventilated. Worse still, it usually has no outlook except on pigpens and chicken-runs; Mrs. Farmer stands at her work, hour after hour, with nothing new to see or think of. Small wonder that she often gets blue and discouraged, milling over the little worries and petty slights, until they grow to huge proportions!

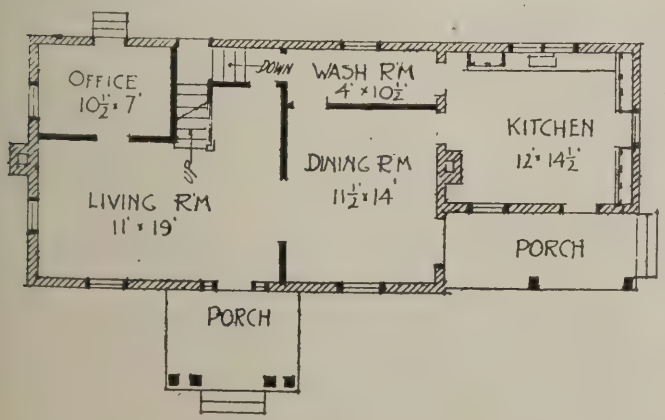
So, I've planned her kitchen with plenty of light and air, windows on three sides; she has an outlook in nearly every direction, and can see all that passes. "It's a great comfort to a lonely farm woman, if she can have a view of the road; the neighbors driving by are very real company to her," writes a farmer's wife to me. I've omitted the old-fashioned pantry; but I've put plenty of cupboards in the kitchen, so that all the groceries and foodstuffs may be kept right at arm's length. These cupboards are much more roomy than those in an ordinary town kitchen, for, of course, a farmer's wife cannot run just around the corner to the grocery store whenever she needs a pinch of baking powder. She must keep good stocks of everything on hand, and so must have ample storage space.

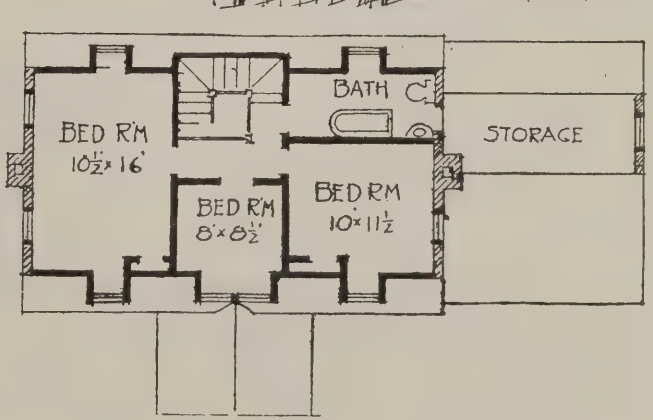
Next to the kitchen comes the washroom, a room that city folk never need, though it is vitally necessary on the farm. The men enter by the grade doorway, on the cellar stairs; come up to the washroom, take off muddy boots, stable-scented overalls, dripping raincoats; scrub grimy hands and faces, and make themselves presentable for dinner or supper. If there is no washroom, all this must take place in the kitchen—to the despair of the farmer's wife. "It surely gets on a woman's nerves to have a lot of men come crowding into her kitchen, when she's all fussed up, hurrying to serve a meal," writes one woman to me.

The little office is another vital feature of the modern farmhouse, for the modern farmer is both business and professional man, and needs a place to meet his business friends, as well as to keep his records and study his books, bulletins, etc.

The rest of the house has no unusual features—it's just a plain simple home, but a very practical farm home.







Questions, Answers, Kinks and Discussions

Edited by V. L. Sherman

Herein is a Department of Mutual Help for the Exchange of Experiences and Ideas. It is Not Only Well Worth Your While to Give Your Experiences for What You Get Back from Others, but National Builder Pays You for Doing So in Good Hard Cash

Form Lifter

Fig. 1, submitted by L. E. McK., Chicago, illustrates his method of removing forms from concrete where the forms are hard to reach. He writes: "Here is a side partner for the wire cutting bar of L. L. M. I have found it hard and expensive work to get the forms out of the ditch after the wires are cut. This was especially so when the panels were between piers or where the earth was packed against the forms at the bottom. So when the forms are being made I have a U-bolt fastened in the studs near the ends, as shown in the sketch. After the wires are cut use the bar to pry away the forms from the wall a few inches. Then take a chain with a hook on the end and a 4x4. Block up under the 4x4 on the wall and wrap the chain around it and hook into the U-bolt. A little pressure on the 4x4 does the rest. This method saves labor and it also saves forms as they come out without any damage at all."

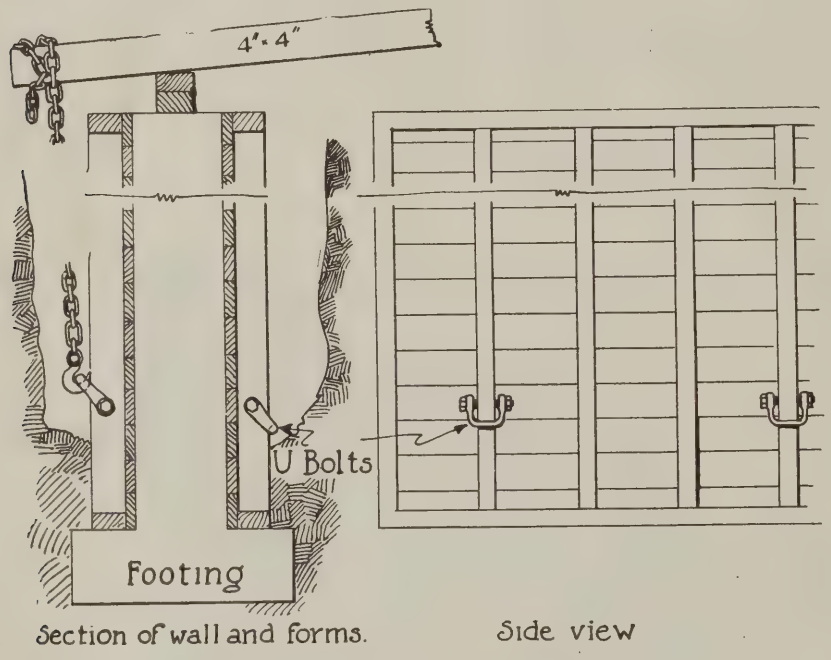


Fig. 1

A Bedroom Fireplace

We submit Fig. 2 for opinions, on an inquiry by P. C. D. He writes that he is asked to place a small fireplace in a bedroom but is in doubt as to how to go about it since the chimney is so shallow. As it stands the chimney is built from its own foundation and any masonry connecting with it ought to be free of the framing. The lower, or living room section is shown in solid lines and the upper section with the fireplace location is shown in dotted lines.

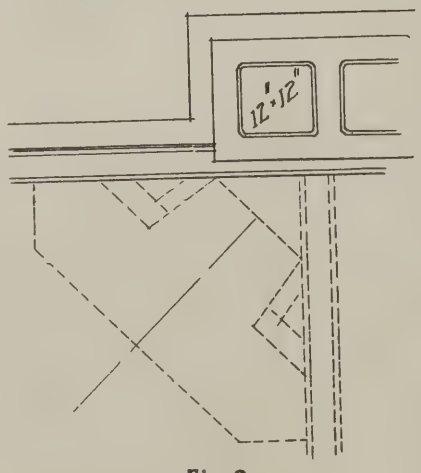


Fig. 2

To Prevent Plaster Cracks

L. C. B. writes that he has found a method of preventing plaster cracks. "When hard coat plaster is put on during the warmer weather or when the building is dry I find it a good thing to turn the hose on the lath before applying the coat. I figure it on the same principle that I do in wetting down a plate before setting it on the mortar. There should be enough moisture in the wood to prevent its absorbing that of the plaster. I do actually soak it enough so that it will remain damp for two or three hours on a very dry day."

The Value of Simpleness

Along with everyone else we have our likes and dislikes. At times they are so extreme that our only relief is to mull over our ideas with a friend. The last of these discussions was spent on roofs and the general outlines of a house. The Scotch friend who is a builder, to be more precise, a builder for owners, sometimes works under the direction of an architect. Usually he works from his own drawings which are made up while talking over the proposed building with the owner. His houses are very successful, and his clients permanent advertisements in that they are always entirely satisfied with their homes.

Two photographs were discussed. Both were photographs of homes drawn by architects, both were as near perfection as could be, in our minds, and neither could have been dated or marked to any particular hand. They were simple but built by masters, who worked, not for the effect produced from the outside, but for comfort and use. The architects knew before they began work that the exteriors would be safe

Home in Fieldston, N. Y. James Dwight Baum, Architect

in their hands when the floor plans were finished.

"Houses are built to live in and not to look on therefore let Use be preferred before Uniformity, except when both may be had."—Bacon.

All this is merely to introduce the trend of his remarks. "When building a house plans should not be used promiscuously. There is a Swiss chalet over on the south edge of town which has no background of any sort, and while it is a very good piece of its type it looks very lonesome. There are any number of houses in town which do not fit and cannot be made to fit because they were built from plans that were bought, and made by draftsmen who had no particular aim in view. Nobody checked them in all likelihood, and the builder may have had his hands full to complete the job without botching it entirely. If boughten plans are used be sure you know where they come from or check them carefully. Keep away from plans with cut up roof lines, and unnecessary overhangs and fancy exteriors. 'Build from the inside out' is a good rule and stick to substantial framing. Strength and permanence really strike a man unconsciously and add more to the beauty than most people realize. No good builder should fail to build an attractive home if he knows his business thoroughly and is at all acquainted with the real stuff in the way of architecture, and doesn't add surfaces and paint to distract from poor form."

He added that if all the house plans which are on the market were as well winnowed as those presented by the Architects' Small House Service Bureau there would be precious few left to use.

The Regular Polygon

The proposition of dividing a circle into a given number of equal parts which was submitted recently is shown to be entirely practical when the number of sides is not too great, but mathematically only approximate.

H. E. C., editor of the department of mathematics in *School Science and Mathematics* writes that the problem was disclosed by Chevalier Antoine de Ville in 1628. He adds, "for convenience let the radius equal one. Then O C, in Fig. 3, equals the square root of three which is 1.732. To prove that the method is approximate suppose A E equals the exact side of a polygon of *n* sides. The diameter to be divided as shown and E D produced to intersect the perpendicular bisector of A B at C. Compute O. C. To do so draw E O. Then in triangle E O D, angle D O E equals 360 degrees divided by *n*, and D O equals *n* minus 4 divided by *n*, and O E equals 1. Solve by the Law of Tangents for angle E D O. Then in the right triangle D O C, angle O D C equals 180 degrees minus angle E D O, and D O equals *n* minus 4 divided by *n* whence O C equals *n* minus 4 divided by *n* times the tangent of O D C.

For the various regular polygons the corresponding values of O C, to two decimal places, will be found as follows:

For radius equal to 1 and A E an exact side:

Joy Wheeler Dow, Architect

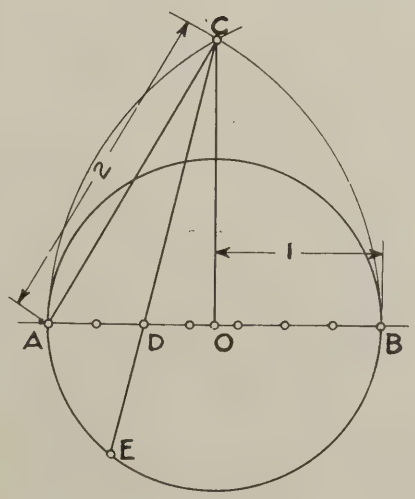


Fig. 3

3.....1.73	6.....1.73	8.....1.71	10.....1.69
5.....1.74	7.....1.72	9.....1.70	11.....1.68

Cornices of Unequally Pitched Roofs

When roofs that intersect are pitched unequally the valleys and the hips do not lie at 45 degrees in the plan. After the rafter passes the plate the same angle continues and if the projection from the wall is the same for both pitches the flatter roof will end above the steeper. Or if they are brought together on an even plate the steeper roof will have less projection. Referring to Fig. 4, A. N. P., El Cajon, Calif., has this to say on the question:

"To the workman who has never been up against this problem this may prove a good

lesson if it does nothing but warn him. A common error is to set the plates of the two portions of the building on a level and the bogey will be in plain sight and not show its teeth until it is too late to dodge. Then if the cornice is wide and the pitches differ considerably the effect will be bad.

"It is plain to see that if two rafters seated on a level one with a rise of 8 in. per foot and the other with 6 in. per foot on a cornice 30 in. wide the ends would be 5 in. apart. The plate of the second must be that much lower or the end of the rafter must be extended to meet the plane of the add to it, and as the wires are spanned before floors are laid, the line will be incorrect. The old system, while involving more work, is worth all the time required. The floor, being first laid to the bridge line, overcomes the inequalities of the joists, and the bridging, which forms one long truss, makes the one absolutely safe job. We once dismantled a building, one where the joists carried considerable weight. It was remarked then how well the bridge joists stood the test of time. Could the same be said of a tensioned wire job?"

What is the experience of other builders?

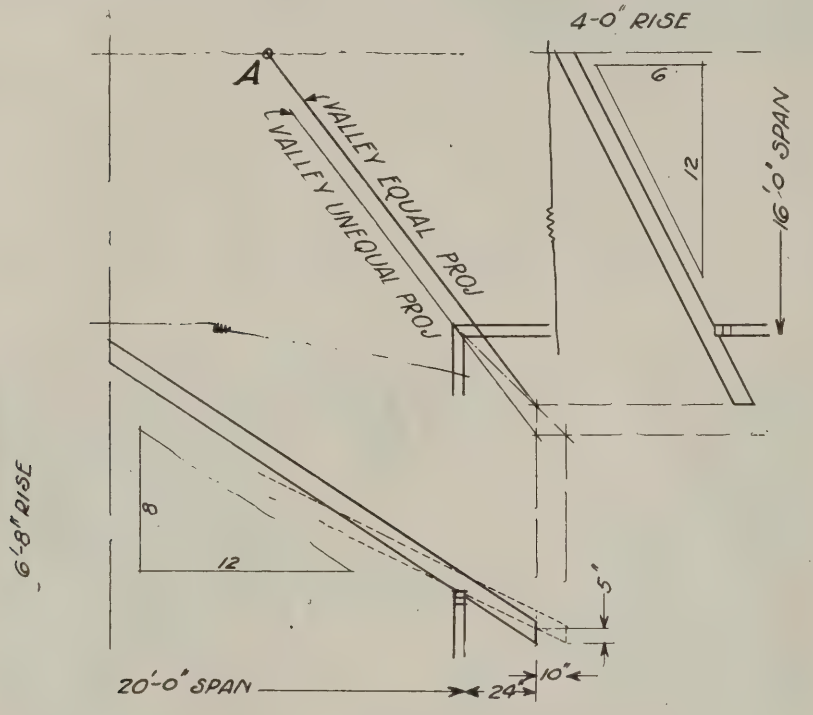


Fig. 4

first which at that difference would be 10 in. on the horizontal and that would not do. It may be a cornice 2 feet inside is wanted for the wing. Their difference at 2 feet out is 4 in., and so on. Of course the valley will not be at an agle of 45 degrees but at 6 and 8 as the roofs pitch. Prove it in this way: The wing is 16 feet; 8 feet at 6 in. is 48 in., which is the height of the ridge. The main roof at 8 in. per foot will reach that height with a run of 6 feet. A simpler way would be to set up the rafters on the lower part and then line and level over to a rafter in the main roof opposite this edge to point *A* where the valley ends.

Tension Cross Bridging

F. R., Easton, Pa., has this to say of the wire-bridging kink shown in the December number: "The Tension Cross Bridging System, submitted by M. P. H. in your December issue is instructive and has the merit of simplicity, yet, as a matter of fairness, we must all expect and even invite criticism of the methods we employ. Briefly, the wires will slacken, the shrinkage of the joists will

Setting a Stair Newel

A. M., Staten Island N. Y., writes: "The readers of National Builder may be interested in the method I use to set stair newels. I let the stringer run through as shown in Fig. 5 and provide in it for a wedge. When the wedge is glued in tight and one or two nails are driven in from the face of the newel into the stringer you have a very substantial job and avoid much tinkering."

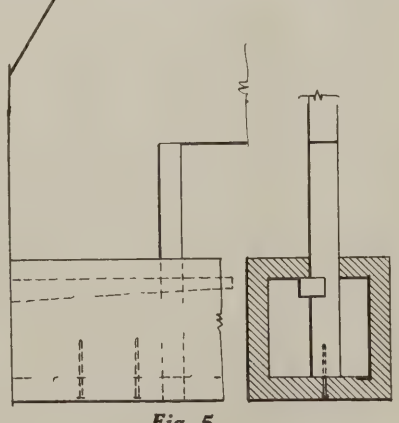


Fig. 5

Soot and Combustion

Indianapolis, Ind., Dec. 12, 1922.

To the Editor:

I notice in the last issue of National Builder an article of how to keep soot out of smoke pipes and flues. Salt is given as the remedy and is efficient.

While we are a nation of coal burners, it seems that very few, indeed, have learned that coal ashes make a splendid fuel.

Ashes are simply fuel unconsumed and if burned along with your coal are without an equal as a soot preventer and remover.

Now, in operating a common Hot Air Furnace over a period of many years, I never accumulated a spoonful of ashes. Twice each 24 hours is sufficient time to devote to the care of a good heating plant. But we must burn the ashes if we wish to be economical and at the same time get best results from the furnace. When your fire is "going good" morning or evening, shake down the ashes, wet them thoroughly and pile back on top of the fire that has had some fresh coal added. But sure to leave a ring of fire vent showing all around the fire bowl or pot. Within a few minutes a blue hydro-carbon blaze will be seen playing all over the surface of the wet ashes, for all the world likes an anthracite flicker.

After a day or so it will be necessary to separate the ashes from the clinkers that will result from the perfect combustion that attends your efforts. Clinkers are the inevitable result of complete combustion. I have had coal dealers to "guarantee no clinkers" to the coal they sold, yet within 36 hours carry them one as large as the furnace door would allow exit. A no clinker coal is a coal not completely consumed. Try it and be convinced. Save one-third of your coal bill and be free from soot in pipe and flue. No matter what coal you burn—slack, good lump or anthracite—burn the ashes.

E. P. McCaslin.

Warning

WE have been informed that one Charles Walker is soliciting subscriptions for National Builder as a representative of a certain subscription agency.

We hereby warn our readers against this individual and all others claiming authority to receive money personally outside our office for subscriptions to this journal.

National Builder does not employ solicitors or subscription agencies for work of this kind. All subscriptions are sold directly by mail from our main office, 542 South Dearborn Street, Chicago, or by our authorized representatives at the larger building shows.

Our friends will do us a favor by reporting to us the names, addresses and other data that will assist us in apprehending anyone fraudulently claiming to represent National Builder.

TRADEPRESS PUBLISHING CORPN.
Publishers of National Builder

The Situation

PROBABLY never before in the history of the construction industry in this country has a year begun under more auspicious circumstances than this new year of 1923. In spite of the winter season a record amount of building work remains underway and building permits show remarkable activity for this season of the year. All this work and activity exists in spite of every handicap. There have been labor troubles, labor shortage, rising wages, rising material prices, coal shortage, transportation shortage and many other national and local problems to contend with. Yet the construction industry as a whole has prospered; and its prosperity has made other industries prosperous.

Now the peak of coal and transportation shortages has been passed. Prices have been fairly stabilized. Wages, too, at the moment, are as stable as they ever have been in the last eight years. The volume of business as a whole is on the increase. Even the prices of agricultural products seem to have touched the lowest level and are rising. There is still the bugaboo of another coal miners' strike and of a serious labor shortage, yet, never did the sun set on a year with rosier prospects for the year to come—in the building industry at least.

This optimism is reflected on all sides. Recently the Illinois State Highway Department opened bids for many miles of concrete road; the work to be started next spring; and the number of bidders and their bids showed no lack of confidence in next year's outlook. A report from the employment service of the Department of Labor at Washington, D. C., dated December 10, reads: "That a greater improvement took place in November than in any month since January last. There were 44,653 more employes on the pay rolls of 1428 concerns in 65 industrial centers on November 30 than on October 1. In 52 of the 65 cities there was an increase in employment and in only eleven a decrease. Further extension was prevented by inadequate rail transportation. Employment gains in the iron and steel industry were almost equaled by the advance in tobacco, textiles, and metal and metal products other than iron and steel. All manifestations point to a steady upward trend in employment. The mounting increases of the last twelve months give substantial evidence of permanency."

Undoubtedly the most serious factor in the present situation is the shortage and prospective shortage of building trades labor. If building craftsmen will be satisfied with reasonable wages and give a full measure of service for their wages, they will probably enjoy the most prosperous year in history. If they are short-sighted and insist on pyramiding their wages, they will just as certainly add the straw that breaks the camel's back, and capital for new work will not be forthcoming.

It is hard for workmen to realize that because their wages have been jumped from 50 cents an hour to $1, or $1.50, that they should not, in the face of a shortage of labor be jumped to $2 or $2.50, an hour. But somewhere is a price that will cause the money-lending, or the financing interests, to pull their purse-strings. And when big corporations commence to be conservative, the majority of business men follow suit, without much other reason. It is mob psychology; but it can be a very serious thing to industry as the experience of the year 1920 proved.

Recently Edward M. Craig, secretary of the Chicago Building Construction Employers' Association, wired to secretaries of builders' associations in twelve cities inquiring as to building prospects for 1923, if there was a shortage of mechanics in 1922, if premium wages were paid and if the efficiency of the men showed any improvement.

The following are some of the replies he received:

Cleveland—"Values of building construction during September totaled $9,500,000. Cleveland expects banner building year in 1923. Shortage of plasterers, bricklayers and lathers. Efficiency of men satisfactory."

Milwaukee.—"Shortage of mechanics prevailed in most building trades which necessarily forced contractors to pay premium wages."

Cincinnati.—"Building situation is in a bad state. Doing 100 per cent more building than normally. This has resulted in pyramiding of wages to a point that no one knows what the wage scale is in several trades. Building boom expected to continue next year. Efficiency of men below normal —the more you pay them the less they do. Workmen demanding 25 per cent wage increase."

San Francisco.—"Building boom on. All work done under American plan conditions. Free trade schools have been established in Oakland and San Francisco. The latter city appears to be permanently on an open shop basis so far as the building industry is concerned."

St. Paul.—"This has been our best building year. Plenty of work in sight for next year. Increased costs of building materials have checked building somewhat. Efficiency of men increased materially over 1920. Still room for improvement. Best antidote for inefficient workmen is an open shop and a nonunion foreman."

Boston.—"Great deal of work in progress, but not much new work offered. Shortage of bricklayers and plasterers. Efficiency of men has tendency to slowing up or 'slacking,' which was brought about by abnormal demands during war."

Pittsburgh.—"Slight shortage of laborers and bricklayers. Not paying premium wages. Plasterers' wages are $10 a day. Some of them getting $15 a day from outside contractors."

St. Louis.—"No let up in building boom. Shortage of bricklayers. Consensus of opinion indicates that efficiency of men ranges from 60 to 70 per cent to what it was in normal times."

Denver.—"This city is experiencing the biggest building boom in its history. Bigger season expected next year. Wages of mechanics range from $1 to $1.25 an hour. Slight shortage in bricklayers, plumbers and plasterers. City part open and part closed shop for mechanics. Large contractors employ union craftsmen."

Memphis.—"For 1922 building construction values total between $16,000,000 and $18,000,000; 1923 expected to be a busy year. Carpenters on open shop. Slight surplus of plumbers. Bricklayers' wage scale is $1.12½ an hour. During summer many of them have received 1.25 an hour. Efficiency of men about normal."

In Chicago the unions which accepted the Landis award are trying hard to hold their members to their contracts, which expire next April; but it is obvious that the men expect increases in their present wage scales.

Present wages are beginning to attract young men to the building industry. It should be obvious to the densest building trades craftsman that he can not indefinitely draw wages twice to three or four times what other skilled workmen draw without making his job popular. And if it does become popular it will take more than labor union rules and regulations to keep out of a trade ambitious young men.

In San Francisco it has been found that it costs approximately $150 per man to bring in journeymen mechanics from outside points. It costs only approximately $36 per man to train men in the San Francisco Industrial Association's trade schools.

During the last year and a half, in order to meet immediate and acute shortages of certain building trades mechanics, the Industrial Association at various times has brought to San Francisco some 200 men, at a cost in round figures of $150 per man. Within the past nine months the association has trained 170 young men in its schools for plasterers and plumbers at a total cost of approximately $36 per man—a saving of $114 per man.

With the training secured in these schools,

the student enters his trade as an advanced apprentice, with the guarantee that he will be given the rank and pay of a journeyman at the very earliest moment he can qualify as such. In other words, the old idea of a set term of apprenticeship has been abandoned. As a matter of fact, no time limit at all is fixed. Thus the whole matter of the apprentice's advancement to the rank and pay of a journeyman depends only upon his individual proficiency. Furthermore, local contractors state that the young men trained in the association's schools are already as capable as the average itinerant journeyman; and they are improving, of course, every day.

In conclusion—the prosperity of the building industry in 1923 is largely in the hands of the building trades workman. If he is wise he will not add the straw to the camel's back.

Announcements and Publications

Pumps, Hay Loading Tools and Door Hangers of various types are displayed and numbered on a handsome wall catalogue and calendar issued by The F. E. Meyers & Bro. Co., Ashland, Ohio. The utility of the display as an exhibit of the various types in making a selection of which is most desirable for a given service marks it as a fine example of discriminating merchandising for all interested, manufacturer, dealer and buyer.

Advantages of Protected Frame Construction—The Underwriters' Report, according a one-hour rating to wood stud and wood joist construction when it is covered with metal lath and gypsum plaster, is being used to overcome the sales resistance that is often encountered because of the more or less general belief that lumber construction creates a national fire hazard. The economy of wood construction has always been recognized, but its value as a fire resistant construction has never been appreciated. The importance from a fire resistant point of view of the combination construction can be best understood by thinking of it in relation to the Burlington office building fire in Chicago last year. Each floor of that building, in the opinion of fire protection engineers, suffered an exposure of the duration and temperature equal to the conditions imposed by the Underwriters' Laboratories in their standard one-hour fire test. Protected frame construction can be used advantageously in the following positions:

(1) Over heating plants, fuel storage and heat ducts, and back of ranges for private residences and duplexes.
(2) Entire basement ceilings of all other wood joisted buildings.
(3) Public halls and stairs of apartments.
(4) Over stores and around stairs when living quarters.
(5) Inside of all attached garages with wood studs or joists.
(6) Protection for all structural wood (joists and bearing partitions—not mill construction) in public institutions; i. e., hospitals, hotels, schools, factories, mercantile establishments, etc.
(7) Stucco on two and one-half story buildings wherever masonry walls with unprotected openings are required.

The Associated Metal Lath Manufacturers' Association and the National Lumber Manufacturers' Association are jointly urging city officials and others to consider the advantages of protected frame construction in open competition with other more generally recognized fire-resistive types of constructions.

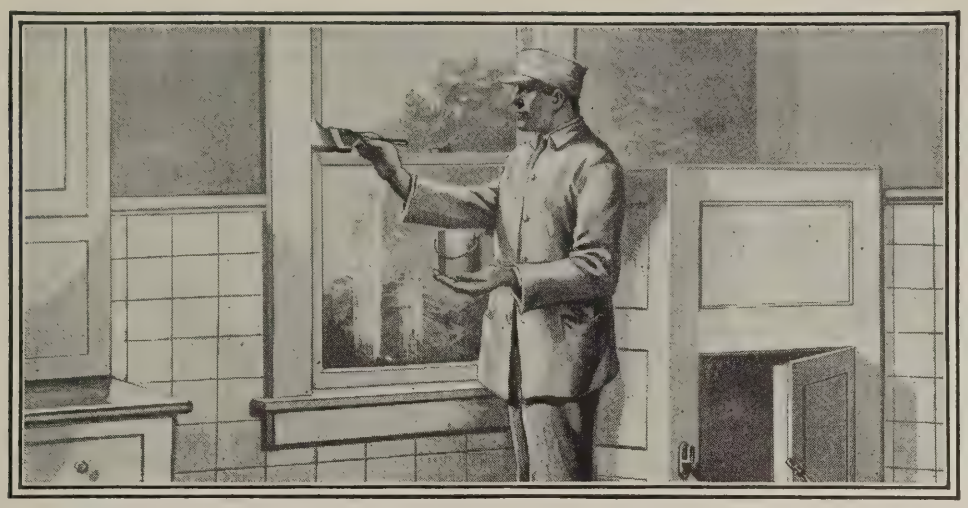
Slate Industry to Meet in New York, January 22-23.—Invitations to a general meeting of everyone interested in the slate industry have been extended by the National Slate Association, 757 Drexel Building, Philadelphia. The meetings will be held at the Commodore Hotel, New York City, on Monday and Tuesday, January 22 and 23. Operators of quarries, mill representatives and of plants manufacturing slate products, distributors, dealers, roofers and setters of slate, etc., are invited. Dr. Oliver Bowles, of the United States Bureau of Mines, will preside at the opening session devoted to an exchange of experiences by producers on quarry and production problems, and the new uses of slate developed in 1922 and others under investigation. Opportunity will be given equipment manufacturers to make demonstrations of new apparatus and methods applicable to the slate industry. Discussions of common problems will be held for roofing contractors and other users of slate with producers and distributors. President Keenan and the board of directors will announce the winning slogan and insignia.

Substitutions for Brass and Copper are an evil that has increased out of war conditions. Many articles in every day use, such as locks, bolts, door knobs, padlocks, screw eyes, letter boxes, etc., sold as solid brass are frequently merely iron or steel plated or dipped with brass. This is an evil which has assumed large proportions, according to a paper by George C. St. John, vice-president of the U. T. Hungerford Brass & Copper Co., on the subject of "Substitution, the Fraud of the Day," in the bulletin of the Copper and Brass Research Association, 25 Broadway, New York. Drastic corrective measures are urged. Buyers, if they want solid brass, should specifically demand it, and make it clear that unless brass is supplied, the articles will be returned and a claim made for credit even though months may elapse before deterioration is apparent. They should also insist that invoices or cash sale slips specify exactly what is being sold—that is, solid brass, brass plated, or dipped brass, otherwise it would be difficult to obtain a refund or other redress. Each metal has its own field. Iron and steel are the very bulwarks of engineering and building development and no nonferrous proponent would attempt to substitute brass and copper for bridge girders or rails! Conversely, an iron and steel man would not argue against the use of copper and brass for the purposes mentioned in this article. Copper and brass are now being sold at prices which are about those of a twenty-year pre-war average. There is accordingly no valid reason for substitution, as the difference between the cost of producing the average household hardware article, such as door knobs, letter boxes, bolts and chains, etc., is represented only by the value of the metal itself, manufacturing and installation costs being substantially the same.

Plain Concrete for Farm Use—The requirements of good concrete and the making and placing of plain concrete according to the best practice, is discussed in Farmers' Bulletin 1279, "Plain Concrete for Farm Use," by T. A. H. Miller, agricultural engineer, just issued by the United States Department of Agriculture. The bulletin treats also of quality, proportions, and quantities of material required, forms, mixing, placing, curing, expansion joints, surface finish, lintels, concrete exposed to fire, and water-tight concrete. Rarely can a farm be found on which concrete is not used for some purpose such as foundations, walks, floors, walls, springs and wells, fence posts, silos, dams, septic tanks, and water and feeding troughs. Generally something is known as to the mixing of concrete but it is not always that a concrete of the desired quality is secur that a concrete of the desired quality is secured, or if secured, that it has been done in the most economical way. A concrete of great strength is uneconomical if a weaker mixture will serve and a cheap or weak concrete is costly if it does not fulfill all requirements. The cost of concrete depends not only upon the price of the materials and labor but also upon the judicious use of the two. Lack of foresight in locating the mixing plant, in the design of forms and in planning the successive operations may cause unnecessary expense, while neglect of any one of the precautions which should be observed is likely to result in unsatisfactory work.

Copies of the bulletin may be had free by writing to the United States Department of Agriculture, Washington, D. C.

For Light, Cheerful Rooms



JOHNSON'S ENAMEL

You can't do your best work with inferior materials—and your reputation and success depend upon *always* turning out good work. Build up a reputation as the best contractor in your locality—then you can get the price and will never experience a poor season.

Contractors who use Johnson's Artistic Interior Finishes soon find themselves getting more of the profitable, better class work. Johnson's Artistic Interior Finishes are right when they go into the can and they stay right. They do not change or deteriorate in any way.

You can give your customers the finest kind of a job by finishing both walls and trim with Johnson's Perfectone Undercoat and Johnson's Perfectone Enamel. These products will give equally good satisfaction on wood, plaster and metal. With them you can turn out perfect work—satisfy your trade and complete more jobs each season.

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It's the best book ever published on Artistic Wood Finishing—the work of famous experts—illustrated in color. This book is written for the practical man—it gives covering capacity, includes color charts, etc. We will gladly send it free and postpaid.

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New Devices, Methods and Improvements in the Building Industry

Floor Surfacing

THE modern system of floor surfacing has done away with tedious and laborious and expensive handwork. Here is a surfacing machine that is bringing out in uniform beauty all the latent effects in the

Floor surfacing machines do the work of many men and do it better

flooring and hastening the time that the building may be turned over to the owners. The reputation for getting things done in this manner has given Dave Adams, Glen Ellyn, Ill., builder and contractor, a deserved prominence. High grade skill and modern machinery, good taste, integrity and business sense are his working assets.

Adjustable Scaffolds

A LINE of labor-saving scaffolds and brackets put out by the Neville Manufacturing Co., Kewanee, Ill., is shown in the accompanying illustrations. Fig. 1 shows a scaffold for mason's use in building chimneys, easy to carry and place in position. No nailing is required and there is no damage to the roof. Two pairs of brackets, each pair forming a saddle, are hung over the ridge on each side of the proposed chimney. A horizontal bar is raised to ridge level and connects to supporting posts. Boards are laid across and the scaffold is complete. For chimneys on the side of the roof, the bracket is lengthened up the side of the roof, the center at base of chimney. Short hooks with which the bracket is provided are sprung so as to engage the sheathing or a roof ladder. The horizontal bar is raised and a plank laid across. The scaffold can be used on shingle, metal, slate or composition roofs without damage to the roof. It folds up compactly in convenient form for handling. Each bracket weighs about 38 lbs.

Fig. 2 shows a bracket to support roof staging while laying wood shingles, metal, slate, composition or roofing in rolls. It is a ¼x1¼-in. bar of soft steel, 5 ft. 4 in. long, arched to allow roofing being laid under it. A loop at the lower end receives a 2x4 studding, and the upper end is slotted to hook over a nail driven in the roof sheathing. For all ordinary purposes six of the brackets constitute a set.

Fig. 3 shows a bracket of simple construction and light in weight, possessing strength beyond any requirements.

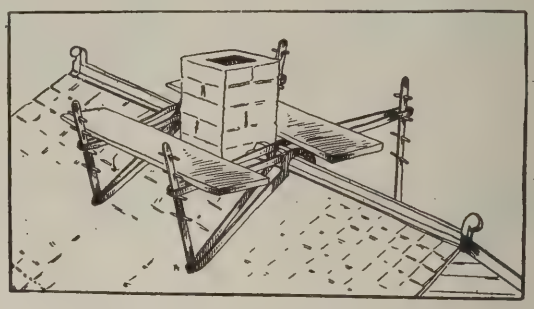

Fig. 1—Mason's chimney scaffold

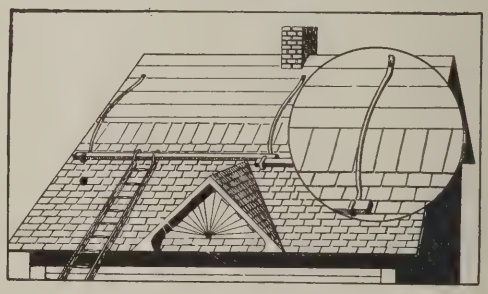

Fig. 2—Roofing bracket

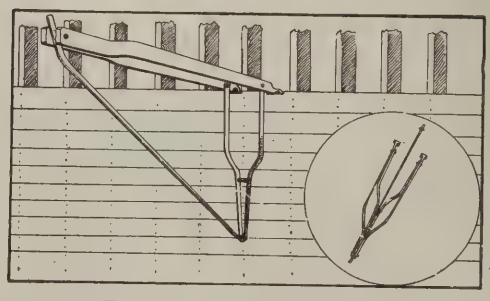

Fig. 3—Sheathing bracket

Trane Vapor Heating

WHAT is vapor heating? It is particularly desirable because of low cost of installation, economy in fuel, less radiation required, no danger from frosts or leaks and pipes entirely freed from the water of condensation. Broadly speaking, vapor heating is the advantage taken of the fact that water boils at sea level at 212 deg. F. But when the atmospheric pressure is removed it boils at 98 deg. F., and vapor heating consists in the removal of atmospheric pressure and water so that a small quantity of water is turned into heating vapor with a comparatively small fire as only 98 deg. of heat are

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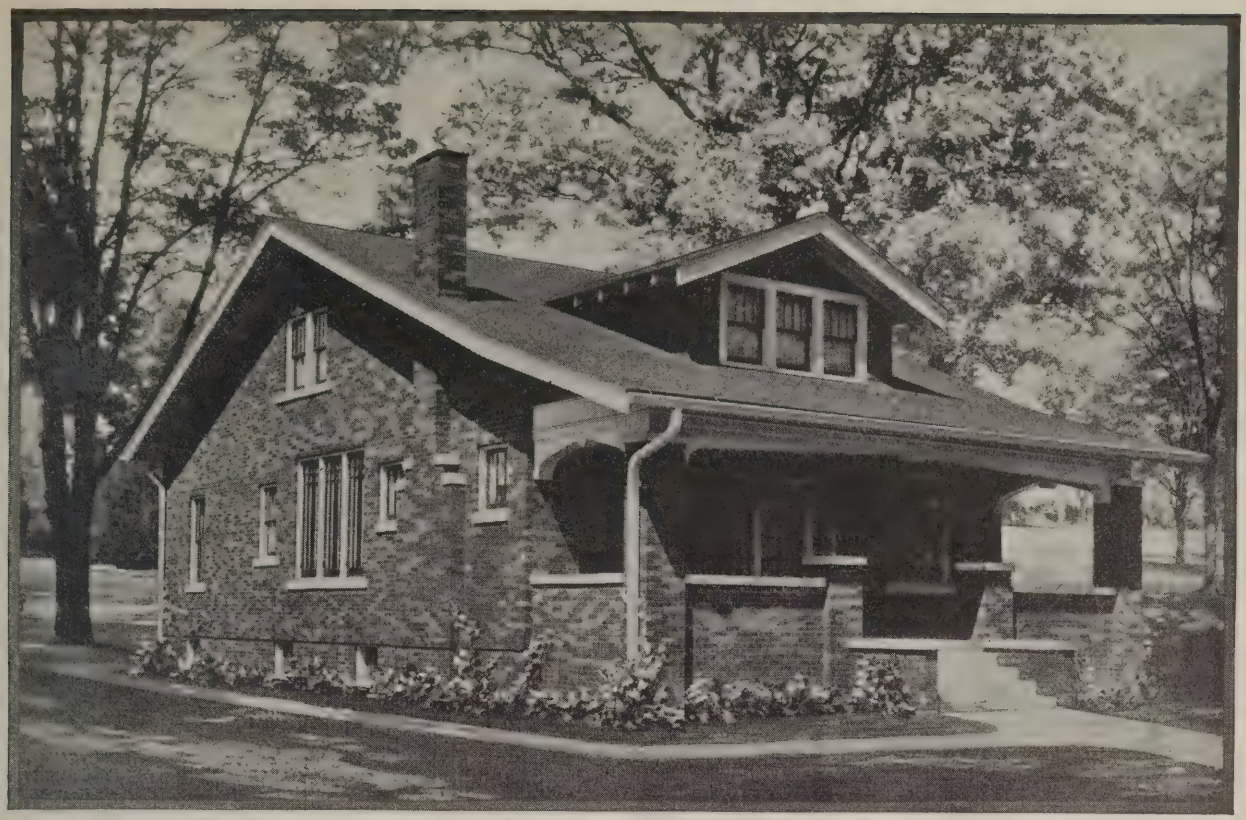

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Proved Practical for Builder and Owner

Every one of these 60 homes has been *actually built and lived in*. The photographs in this book show how they look in real life. These homes sell for more than ordinary houses, in proportion to their cost, because of their beauty and interior arrangement. They are practical and economical to build.

Just 10c brings you this valuable book—an offer never equalled before. And specifications, working drawings, and complete information for every one of these 60 homes, are available at nominal price.

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The Ideal Brick Hollow Wall is made of standard brick obtainable everywhere

Ideal Brick Hollow Wall

"Brick Homes at the Cost of Frame"

required to make steam in vacuum. The Trane system of vapor heating "applicable to any make of steam boiler or radiator," comprehending a scheme of valves and exhausts, is described in Bulletin No. 10 issued by the Trane Company, La Crosse, Wis., with branches in nine principal cities. From it we make the following excerpt: "When fire is started in the boiler, the small amount of water soon becomes heated and the vapor rises through the pipes and enters the top of the radiators, displacing the air, which is heavier than the vapor. The air, together with the water of condensation, flows quickly and naturally by gravity through the thermetal traps and return piping to a point near the boiler where the air is exhausted and the water returned to the boiler. As soon as the radiators become hot, less vapor is condensed and the pressure in the boiler begins to rise. Then the sensitive vapor regulator begins to work, closing and opening the drafts, preventing fuel waste and insuring just the amount of pressure necessary for comfort under all weather conditions. Radiator valves also regulate each separate radiator, so that each room may be conditioned as desired."

Fifth Omaha Reservoir Embodies New Principles in Design

THE organization which operates Omaha's water plant has placed in operation the fifth of a series of water reservoirs built on a design which was untried, insofar as they knew, at the time the first was constructed nearly eight years ago. Fifty-nine million gallons of water are now stored in concrete lined basins of this design, and the condition of the first is such that the greatest confidence marks the inauguration into service of the fifth. A design embodying new principles, a constructing unit organized to build with painstaking attention to detail and fidelity to the ideal of absolute perfection of each small unit of the aggregate, has produced a type of reservoir lining that, under the conditions imposed by the local topography and subsoil formation, has met the desires of the designers.

Reservoir under construction. Tilting mixer in the background

Lining Like Concrete "Blankets"

The lining can best be described as a "concrete blanket" since it is not designed to be inflexible. The bearing soil is excellent, but it was expected that there would be local settlement, and a lining was constructed with certain degree of flexibility to conform to these movements.

Tilting mixer discharging. The power loader and extended track makes it possible to take the aggregate from the lower level to the hopper above

Six inches of re-inforced concrete is placed on the carefully compacted soil base in such a way as to get the nearest possible approach to a perfect bond between successive courses, the steel reinforcing is accurately spaced at the determined height above the bottom of the slab, and the aggregate are mixed in a plant designed to produce a product of as near uniform consistency and composition as is possible.

The aggregate used in basin No. 7, constructed in the fall of 1921, consisted of a so-called sand-gravel, which might be quite as properly called a coarse sand, since a very small percentage is retained on a No. 4 sieve. The proportion was one part portland cement to three parts sand-gravel, and to this was added soap and alum as an integral waterproofing. The steel mat consisted of a ½-in. square deformed bars spaced to give four-tenths of one percent of the area of the concrete, both transversely and longitudinally, and was rigidly tied and held so as to have its lower edge one inch above the bottom of the concrete.

Concentric Courses

Concrete was placed in concentric courses around the basin, the width of the course being limited by the height on the slope, which could be placed without slipping. The edges of the previously poured course were roughened where necessary, all was treated with dilute hydrochloric acid and carefully washed. Finishing was done with wood floats and steel trowels.

The mixing plant was a permanent one, consisting of a No. 10-S Smith tilting mixer driven by electric motor, and the necessary receiving hopper and apparatus for mixing and applying the waterproofing. The mixer was placed on a frame at a sufficient height above the ground to allow two-wheeled buggies to be charged from the hopper and the elevating loading skip was served by one-horse dump carts. The Smith loader with extended track takes the aggregate from the lower level to the hopper above. A small boiler was necessary for dissolving the waterproofing soap and alum, and electrically driven pumps handled the prepared tempering water to the gauging tanks.

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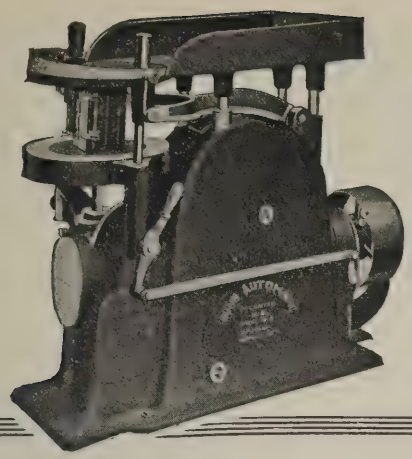


This Great Machine Is The Key To A Highly Successful Business For You

Within Twenty Minutes the DUNN AUTOMATIC Can Be Changed to Make Four Superior Products for Which There Are Unlimited Markets

THIS remarkable production machine has completely solved the problem of making the finest of concrete products **economically.** Not only does it speed up production, but it makes better products — products that are exclusive beyond the reach of competition.

The Standardized DUNTILE Plant

Our standard, scientific plan for complete DUNTILE manufacturing plants has made it exceptionally easy for wide-awake men to get into this very profitable business. What is even more important, however, the fully standardized system of manufacture assures maximum output with at least one man less than is required in other concrete products plants.

The Great Market for DUNTILE

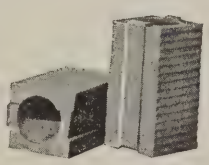
The unusual adaptability of DUNTILE—the fact that it builds better buildings of all types cheaper—speedily creates an immense demand in every community where it is introduced. There is nothing like it; no product that combines great strength, light weight and ease of handling so thoroughly. It simplifies the architect's problem; saves money for the builder; puts extra profit into the pocket of the contractor; yields the manufacturer truly astonishing returns on his investment.

DUNTILE

There is only one Duntile, and it is made by the Dunn Automatic. The underlying reason for the popularity and demand of this light-weight, load-bearing building unit is found in the fact that Duntile builds better buildings cheaper. Let us tell you why.

SILO TILE

Building a masonary silo without mortar is what Dunn Silo Tile accomplishes. Therein is the big reason why it is such a profitable product to manufacture. It has many other uses which serve to expand its market.



DRAIN TILE

Drain Tile offers a more attractive manufacturer's profit than any other staple concrete product. As for quality, Dunn Drain Tile has long since earned the reputation of being the best that can be made.

CONDUIT TILE

Conduit Tile, for electric wires, etc., is admittedly a specialty in the field of concrete products. But it is in the specialties that the largest profits are made. Like Duntile, Drain Tile and Silo Tile, it is made by the Dunn Automatic.

Every Hour of Every Day Produces Profits

In many plants the machines often run for weeks at a time on DUNTILE alone. But within twenty minutes of the time a batch is completed the same machines are actually producing some one of the other products at equally good profits.

Send Today for BASIC FACTS

We have issued a book called BASIC FACTS. It presents everything you need to know about the great business future of concrete products. It also shows why other men the country over are making big incomes in this field. You will find both this book and our Bulletin A-22 extremely interesting and full of valuable information. Write for your copies today; they will be sent at once without any obligation on your part.

W. E. Dunn Manufacturing Co.

415 W. 23rd STREET

HOLLAND, MICHIGAN

DUNN STANDARDIZED TILE PLANTS
COMPLETELY EQUIPPED FOR MANUFACTURING
BUILDING, DRAIN AND SILO TILE.

DUNN TILE MACHINES
DUNN SHOVEL MIXERS FOR PRODUCTS PLANTS
DUNN CONCRETE, MORTAR AND PLASTER MIXERS.

DUNN POWER EQUIPMENT TRIPLE UTILITY

DUNN POWER EQUIPMENT TRIPLE UTILITY

Twenty Million Gallons' Capacity

All aggregates were carefully measured, including the sand-gravel, the cement water and soap. The time of mixing was kept uniform and of sufficient amount, and every precaution taken to insure the highest possible quality of concrete.

Basin No. 7 is 303 feet by 385 feet, and the depth from top of parapet to bottom of mud compartment is 36.5 feet. Its capacity is 20,000,000 gallons, and will serve as a clear water basin in the present sedimentation system of purification, but is so located as to be used for the effluent from a filter plant. Mr. Knouse, engineer of the water board of Omaha, was in charge of this work.

Pipe Threading by Portable Power

THE development of machines to replace man-power is shown in an interesting way in the Toledo power-drive, a portable unit that converts hand tools for cutting and threading into efficient power equipment.

Toledo portable power unit applied to ordinary pipe-threading tools

The unit is also applicable to a variety of purposes, such as operating a winch to pull electrical cable through conduits, etc. The illustration shows the power-drive in the basement of a Glen Ellyn, Ill., residence, Dave Adams, contractor and builder, one of the most efficient and successful builders in the section.

New Method of Measuring Sand Makes Concrete More Reliable

THE reliability of concrete construction is likely to be increased, and the cost in some cases reduced, by the application of a newly developed method of measuring sand, which is now being tested at the Bureau of Standards of the Department of Commerce. The method has been termed the "inundation method" and consists of measuring sand in a container which has been partly filled with water before the sand is put in, so that when the sand is in the water is up to the top and the sand completely soaked.

The volume occupied by a given amount of sand when shoveled into a measuring device varies with the moisture content of the sand; the difference in measured volume between dry and moist sand being usually from 10 to 15 per cent and occasionally running as high as 50 per cent. But it is found that if the sand is completely soaked or "inundated" uniform measuring results can be obtained no matter how much the original moisture content may have varied.

In making concrete the proportions of cement, sand, stone and water are so chosen as to get the required strength and workability with a minimum of cement, since the cement is the chief factor in the cost. Inaccurate measurement of the sand may result in too large a proportion of sand, in which case the concrete is too weak, or in too small a proportion of sand and hence a concrete too rich in cement.

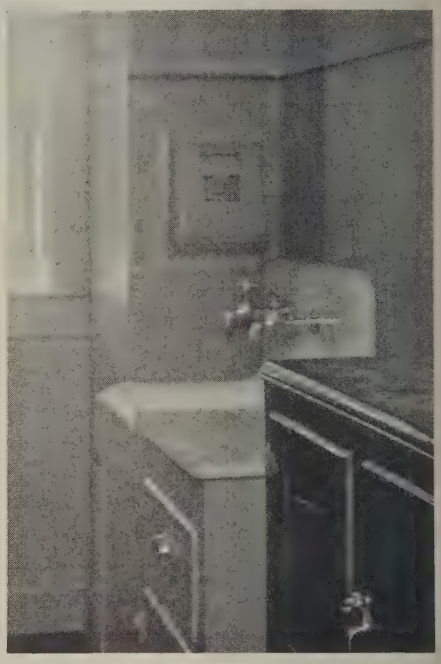
But this rich concrete is not necessarily stronger than the concrete the contractor intended to make, for the sand has brought in some water in addition to that which is added on purpose; and if this extra water is not allowed for and the amount of water added correspondingly decreased the concrete will contain too much water. It will be sloppy and when set will not be dense enough to give the necessary strength. The contractor therefore is merely wasting cement and doing good to no one.

It is hoped that with the inundation method it may be possible to specify concrete by the strength required rather than by arbitrary proportions. The contractor can then find the proportions of the materials he is using that will give the requisite strength and can adhere closely to these proportions. The result will be a concrete whose proportions are more nearly what they were intended to be, and with which a lower factor of safety can be used.

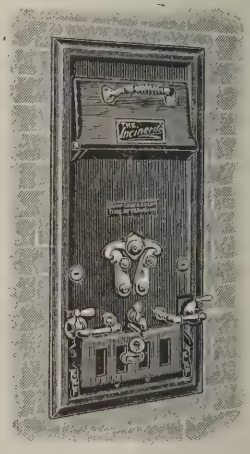
(Continued on page 82)

Incinerators

COMMUNITY sanitation and the sanitation of the individual residence, apartment house, or other buildings is accomplished to a large extent by incinerators. They are a type of modern house equipment which have sufficient economies and conveniences to come into the class of profitable investments. It should be obvious that tenants of houses in which these are installed, when under any necessity to move to other quarters will disregard offerings of premises not similarly equipped. Incinerators are made in varied types to meet different conditions.



Kitchen garbage, rubbish, sweepings, etc., are all disposed of cleanly and quickly, dropped down to the incinerator through the door in the chute



A built-in incinerator

REPUBLIC

Complete Stocks at These Cities

Allentown, Pa.	Nashville, Tenn.
Atlanta, Ga.	New Haven, Conn.
Baltimore, Md.	New Orleans, La.
Bluefield, W. Va.	New York City
Boston, Mass.	Norfolk, Va.
Buffalo, N. Y.	Omaha, Neb.
Canton, O.	Montreal, Canada
Chattanooga, Tenn.	Muskogee, Okla.
Chicago, Ill.	Philadelphia, Pa.
Cleveland, O.	Pittsburg, Pa.
Columbus, O.	Portland, Ore.
Dallas, Tex.	Raleigh, N. C.
Detroit, Mich.	Richmond, Va.
Duluth, Minn.	Saginaw, Mich.
Grand Rapids, Mich.	St. Louis, Mo.
Green Bay, Wis.	St. Paul, Minn.
Holyoke, Mass.	Shreveport, La.
Horseheads, N. Y.	Spartanburg, S. C.
Indianapolis, Ind.	Springfield, Mass.
Jacksonville, Fla.	Syracuse, N. Y.
Kansas City, Mo.	Tampa, Fla.
Knoxville, Tenn.	Toledo, O.
Los Angeles, Cal.	Wilmington, N. C.
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Equipment Dealers

We want representatives in several other cities not listed above. Write for our attractive proposition. Address correspondence to our Tecumseh, Michigan, office.

The Most Mixer Value for the Least Expense

HARD DRIVING contractors insist upon speed, durability and economical operation in concrete mixers. They get it in the REPUBLIC line. These mixers are built for long, hard, continuous service.

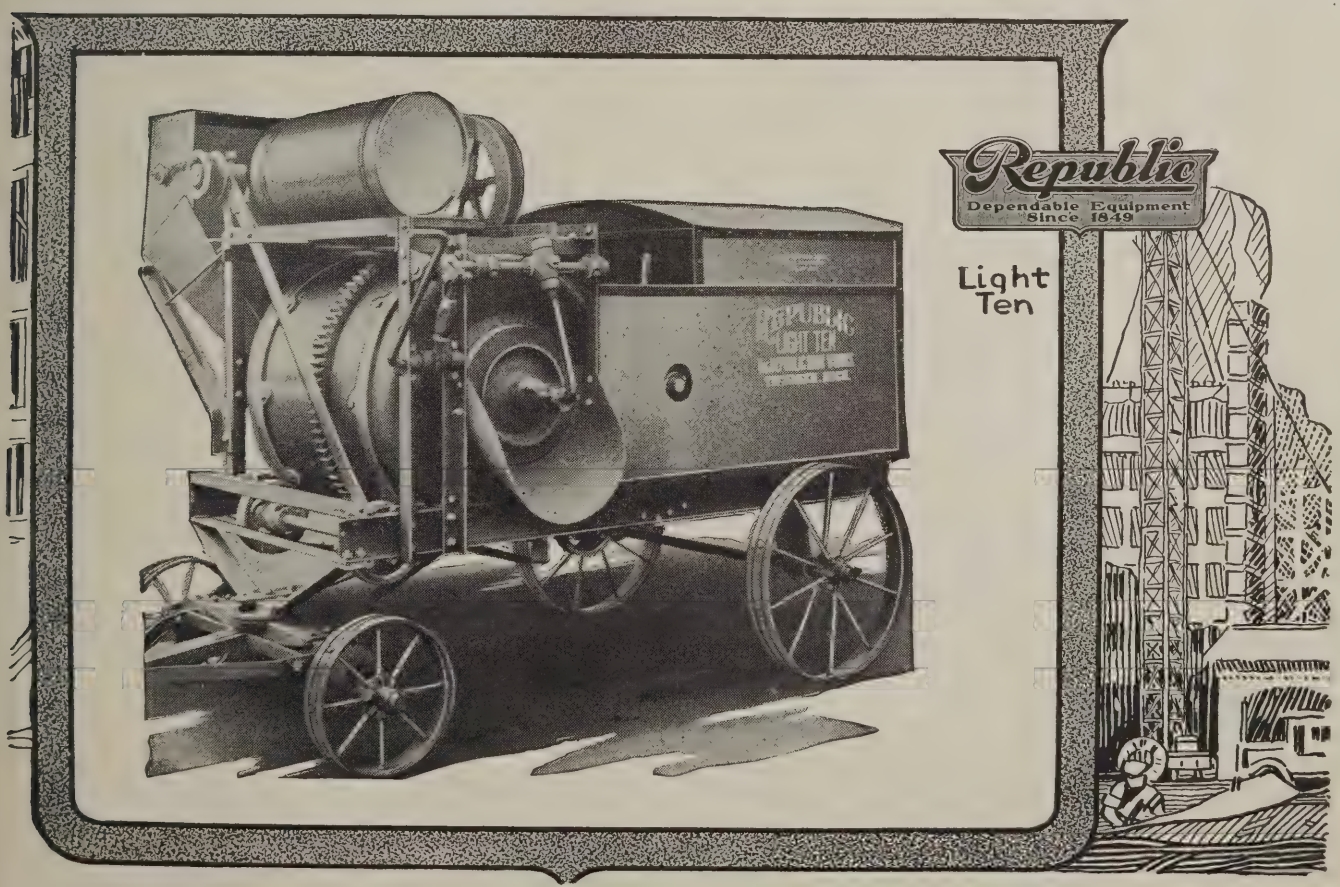
And in addition to this dependable service, REPUBLIC owners profit by new features in mixing principle, construction and convenience which make REPUBLIC MIXERS especially economical to operate.

Looking at it from every angle, you get the most mixer value for the least expense when you choose a REPUBLIC outfit.

Write for catalog and name of your nearest REPUBLIC dealer.

Republic Iron Works

126 Evans St. TECUMSEH, MICH.



Door Bell Transformers

AMONG the items that indicate completeness in house equipment the bell transformer has an appreciable place. The upkeep of batteries, wet or dry, is done away with by this inexpensive device, which is not much larger than the illustration here-

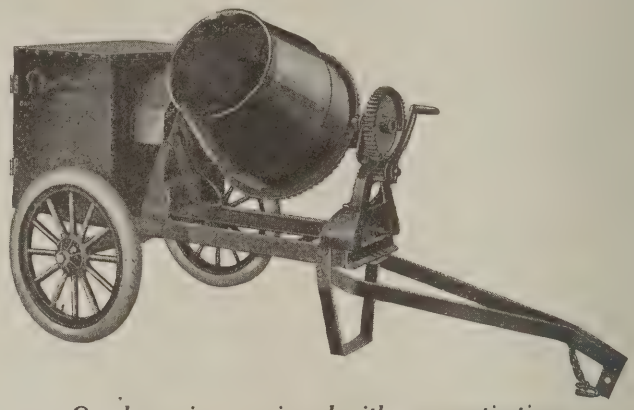
Door bell transformer

with. The transformer is connected with the lighting circuit and uses so small a fraction of current that the cost is only a few cents annually. The installation is in every way cheaper than the battery system. There are various types of transformers on the market. The one shown is a type manufactured by the Thorardson Electric Mfg. Co., 500 West Huron Street, Chicago.

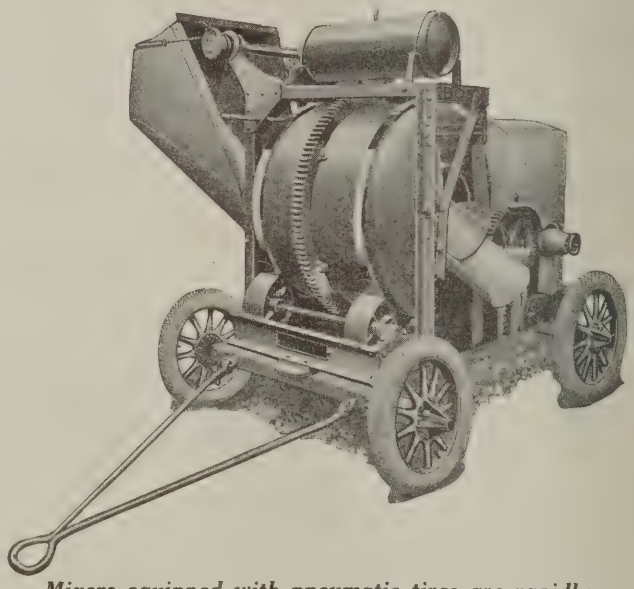
Pneumatic Cord Tires on Mixers

AT the meeting of manufacturers and general contractors in joint conference at Detroit, on October 3, Leonard C. Wason, president of the Aberthaw Construction Co., Boston, Mass., said: "We need you equipment men to help us, because we are really manufacturers in the sense that we assemble crude materials into a finished product. Especially is this true of concrete. We manufacture it into its final assembly. You simply furnish us the tools with which to do this to some extent. In Asia, where labor is worth only a few cents an hour, one cannot afford to use a plant. In the United States, where the other extreme is to be found, the highest paid labor in the world, plant is most desirable and most necessary. In industrial building construction, the mechanical plant runs about 5 per cent of the contract, while the labor of the general contractor is 35 per cent. If we could add 5 per cent to our plant and deduct 5 per cent or more of our labor, we would be delighted to do it. You can help us do this. If you will analyze the plant that is used in transportation—I use that term in the broadest sense of moving materials from one place to another, and in this sense a shovel is an item of transportation of course—the greater part of our plant is used in transporting material. . . . In construction work, in building, especially, there is more hand labor used than in any other form of manufacture than I can think of and particularly is this true of the final assembly. I have never been able to think of a tool which could possibly lay bricks, or assemble lumber in a house. But if you gentlemen, devoting your attention to equipment can concentrate your thought on the final assembly of building material and master those two problems alone, you will be a great blessing to yourselves in the way of selling equipment and a great help to the industry and the individual contractor."

One of the notable responses to the appeal of Mr. Wason for improved transportation is the application of cord tires to cement mixers by the American Cement Machine Co., Inc., Keokuk, Iowa. The small steel wheels ordinarily used on mixers and designed for use with horse-drawn rigs tend to rack and loosen and otherwise damage mixers in transit or when being moved about the job hitched back of a motor truck. The engineers of the company have found that not less than 30-in. wheels with pneumatic tires on the mixers eliminate all noise and rattling, increase speed of handling and transportation. The one-bag mixers are also similarly equipped. In mixing, the axles are blocked up, taking all strain off the tires, and it is said that outfits out for over a year show little if any wear. Replacements are easily and economically made, as Ford standard tires are used.



One-bag mixer equipped with pneumatic tires



Mixers equipped with pneumatic tires are rapidly moved to and about the job, are given longer life, keep in repair and avoid delays

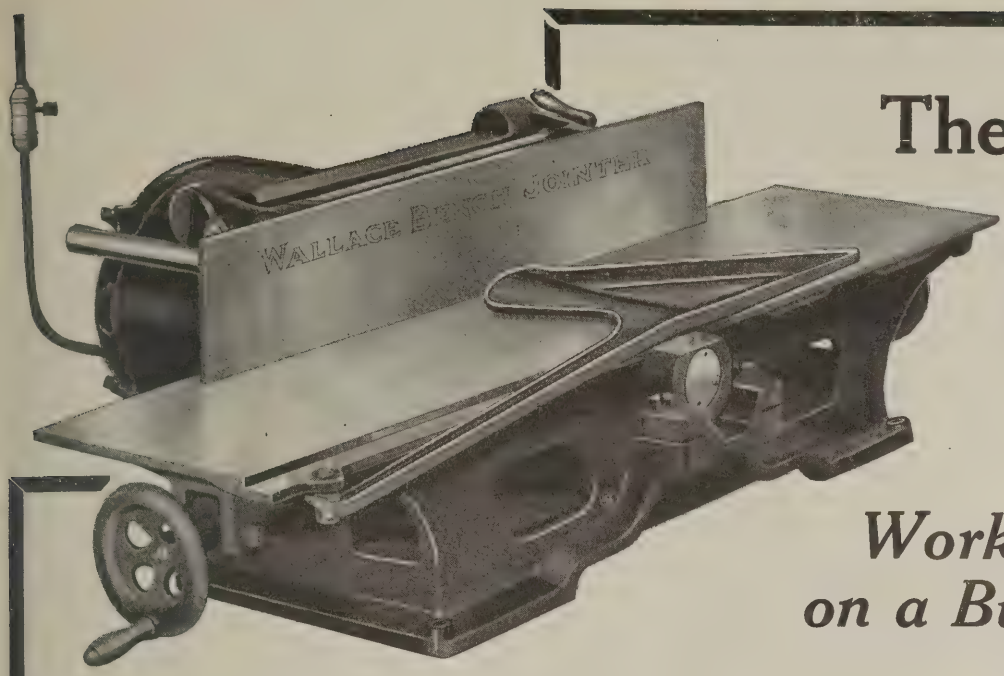
Machine Stains Shingles in Bundles

TESTS of a machine for dipping shingles and staining them in bundles were conducted successfully, according to a correspondent of the *American Lumberman*, on December 12 and 13 at the plant of the C. B. Lumber and Shingle Co., Everett, Wash. The inventor is J. J. Starks.

The tests were made under the most unfavorable weather conditions, since the temperature was below the freezing point, and the plan of staining the shingles "hot from the kiln" was not feasible. Nevertheless, the results obtained were so satisfactory as to be a matter of surprise to most of the spectators, demonstrating that the scheme of staining shingles in the bundle is practicable.

On breaking open the bundles it was found that the stain had been evenly distributed to the weather portion of both

(Continued on page 84)



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Most woodworking shops know the benefits to be derived from the Wallace Bench 6" Jointer. For quantity production on large or small pieces it has no equal. The other machines in the Wallace Line are equally efficient.

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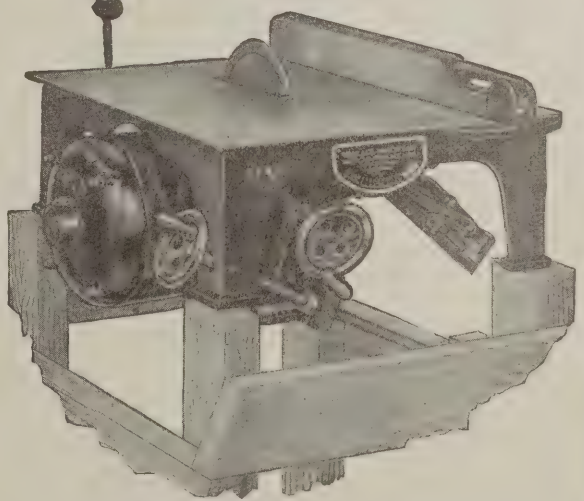

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sides of the material. Perfects absorbed the stain better than did "A," and required slightly heavier gallonage, bearing out the theory that vertical grain stock is best for staining.

Special Motor-Truck Trailers Salvage Ready-Built Houses

AN INTERESTING example of how much the value of a building depends on its location was demonstrated recently in Michigan. Like other localities in Wisconsin, Minnesota and the northwest states generally, villages have grown up and become quite populous and prosperous on the the sole industry of lumbering. After the surrounding timber is all cut off, and if the villages survive brush fires, only empty houses are left to mark the site of the town unless some other industry moves in.

Such houses and their lots become practically valueless unless they happen to be on the lake shore or have other attractive surroundings which make them purchasable for summer homes. The shortage of houses elsewhere and the increasing prices of building materials generally have turned the attention of enterprising men to the possibilities of salvaging these deserted villages, but it is often difficult to salvage some of them because of the abandonment of the railway branch lines with which they were formerly connected.

Now comes an example of enterprise in salvaging practically the whole of the village of Jennings, Mich., by moving the houses away intact to the city of Cadillac, about 11 miles distant. This job is all the more interesting and spectacular because the instigators did not wait for the village to be abandoned but moved the remaining industries, families and residences altogether.

About 100 houses in all were moved. They are mostly 24x40 ft. in size, well built, with hardwood floors. When placed on foundations in the city of Cadillac their value was increased to $2,500 or $3,000.

These houses weigh from 15 to 35 tons each. They were all moved by motor trucks and a special trailer as the views show. The truck and trailer empty weigh about 12 tons, so that the total load hauled over the roads was close to 50 tons. Some of the road had to be paved temporarily with planks to make this possible. It took a truck and trailer about four hours to make the trip. Including loading and unloading and delays on the road the moving crew handle about two houses in three days.

En route from Jennings to Cadillac. At many points the road was just wide enough to allow the truck and loaded trailer to pass

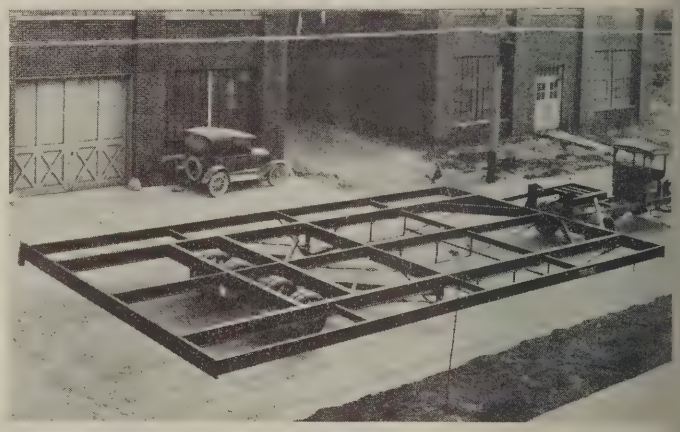
The frame of the trailer is 24 ft. wide by 42 ft. long, built of structural steel. The platform at the forward end which rides the truck is raised 18 in. above the trailer. At the rear the trailer is carried on four cast-steel truck wheels, all abreast, equipped with 40x6 in. dual truck tires.

The wheels are arranged in pairs, each wheel operating on tapered roller bearings supported by a tubular steel axle shaft. The shafts of each pair of wheels are bolted together at the center through a large steel casting which is supported by an extra heavy wrought-iron pipe extending through it and at right angles to the shaft. Heavy steel pillow blocks at either end of this pipe support the weight of the trailer and load through coil springs attached to the trailer frame. This unique construction not only cushions the load but successfully provides for road inequalities, an essential result when taking into consideration that the distance between the outside wheels is 11 ft.

To relieve the springs from driving stresses a radius rod with flexible connections is provided for both sets of wheels, the forward end of which is secured rigidly to the trailer frame and the rear end fastened to the end of the wrought-iron pipe through a swivel connection. In order to maintain perfect alignment of all four wheels, the wrought-iron pipes supporting the axle shafts are tied together by a system of flat bars secured to the trailer frame and so arranged as to compensate for spring deflection.

In loading, the house was raised by a series of jacks located at each side. The two outside longitudinal members of the trailer, which are bolted on, are removed, the trailer is then backed under the building and the house is lowered until it rests evenly on the trailer frame. The side members are replaced if it is found necessary and the unit is ready for its journey.

Typical street scene at Jennings before the house-moving program was started



Special truck and trailer, designed by the Acme Motor Truck Company of Cadillac, for the house-moving project

Portable Electric Slate and Marble Drill

SLATE and marble drilling is ordinarily slow and laborious work. Where the ordinary electric drill is employed such as used for metal or wood drilling disaster follows in burned-out drill bits. A special slow-speed portable electric drill for slate, marble and glass is now on the market as type U-S-D of the Electro-Magnetic Tool Co., 19th Street and 52nd Avenue, Cicero, Ill. The drill is designed to work at slow speed with great pulling power. It weighs 8 lbs. and can be easily carried with any installation kit, and operates from any lighting socket.

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The Only Journal Devoted Exclusively to the Contractor, Architect and Builder

National Builder

ESTABLISHED 1864

Volume 66 February, 1923 Number 2

BERMICO Sheathing Paper

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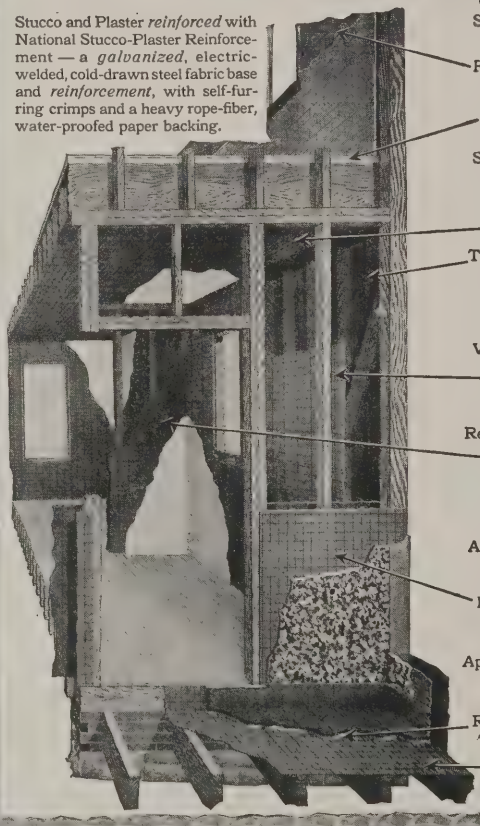

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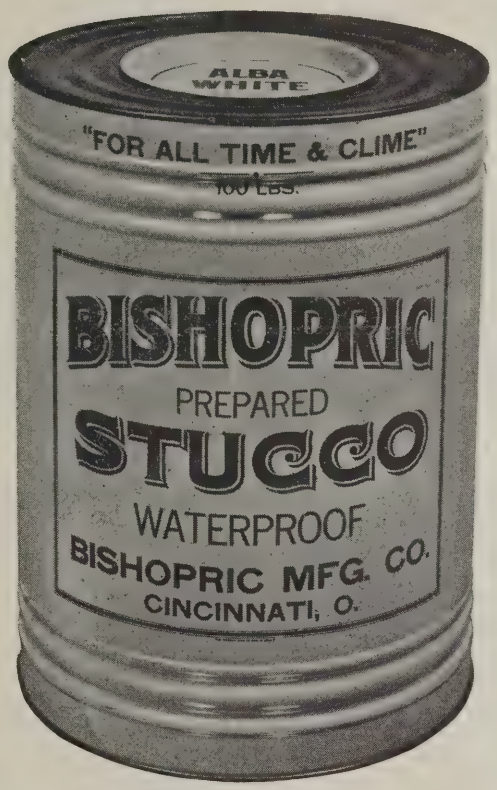

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Volume 66 February, 1923 Number 2

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NATIONAL BUILDER

Volume 66 CHICAGO, FEBRUARY, 1923 Number 2

"House Operator" as Well as Builder

H. Leland Magill, Rye, N. Y., is Artist, Builder, Manager

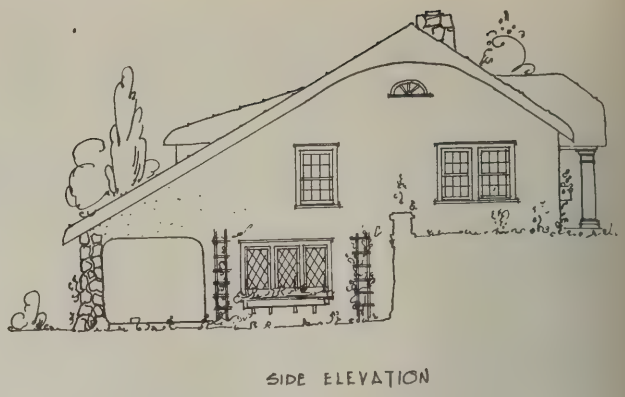
THERE is a group of houses in Rye, N. Y., that automobile parties go out of their way to see—one of those local attractions to be shown week-end visitors, as proof that "we live in finest suburb of New York City."

Rye is a suburban city at the extreme eastern tip of Westchester county, on Long Island Sound. It is the last stop on the New York, New Haven and Hartford R. R. in New York state. Through this little city runs the famous old Boston Post Road,

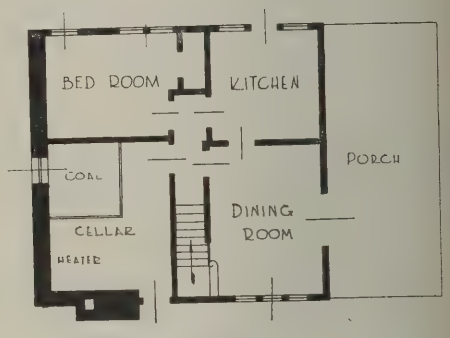
H. Leland Magill

Office of H. Leland Magill

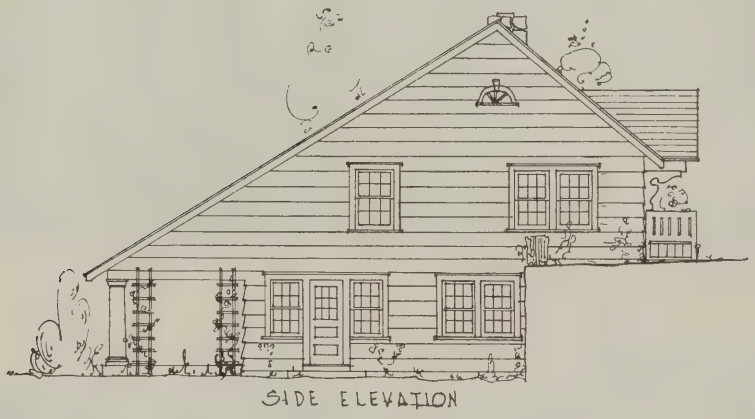
Front view of Houses Nos. 1 and 2. See larger view of House 1 on Style Sheet, page 33

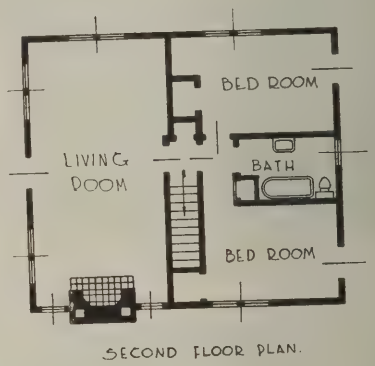


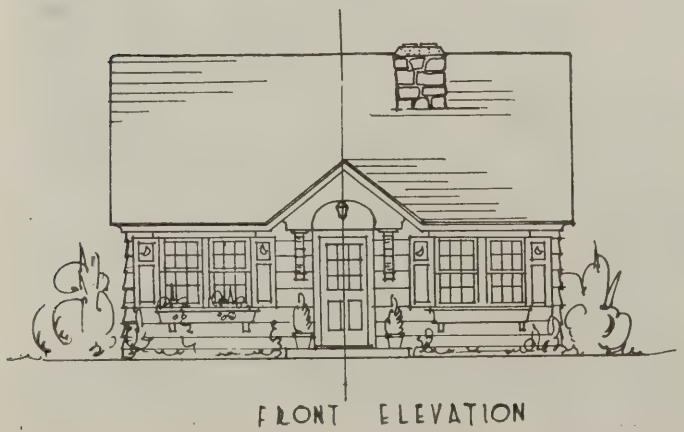
Rear view and side elevation of House No. 1

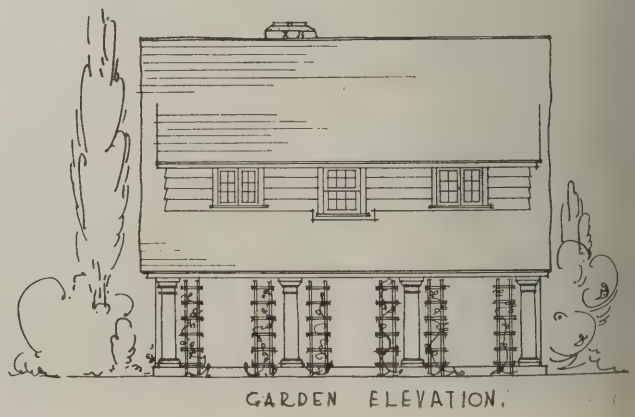


Typical sectional view of house and plans









Typical elevations and plans

Typical interiors

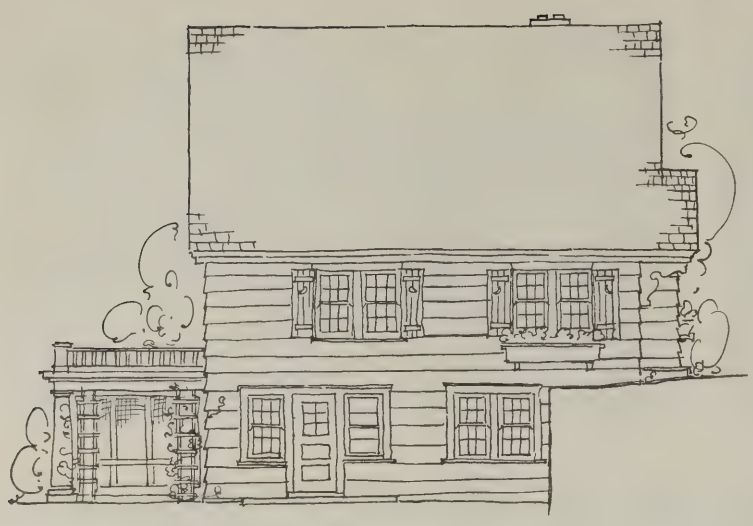
Side view of House No. 3. See large elevation, Style Sheet, page 33

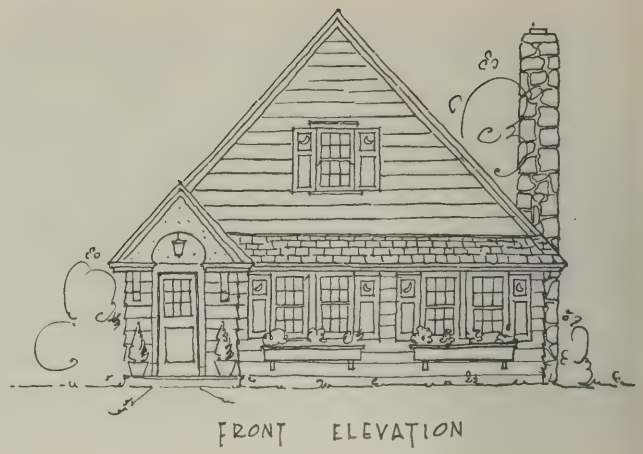
known to every one in the New York district who owns an automobile.

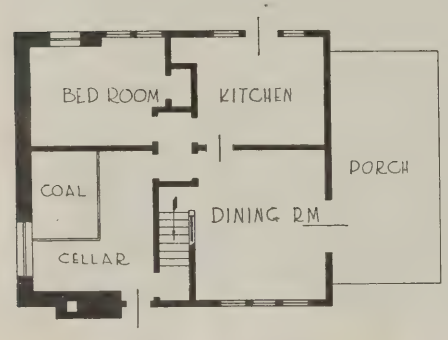
The houses that attract so much attention are near this Boston Post Road—probably the most traveled automobile tourist road in the United States. The landscape is rugged and rocky, quite heavily wooded, thus lending itself very readily to the character of the development.

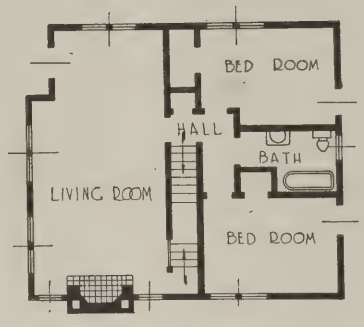
Two brothers are responsible for most of the remarkably pretty little houses which are ideally located on the rugged, rocky, wooded slopes. They are H. Leland Magill and Urwin J. Magill. Some of the work of H. Leland Magill is shown herewith; in the March issue of NATIONAL BUILDER we shall show some of Urwin J. Magill's houses.

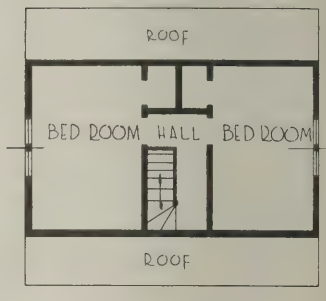
H. Leland Magill is the younger of the two brothers. He attended Pratt Institute,











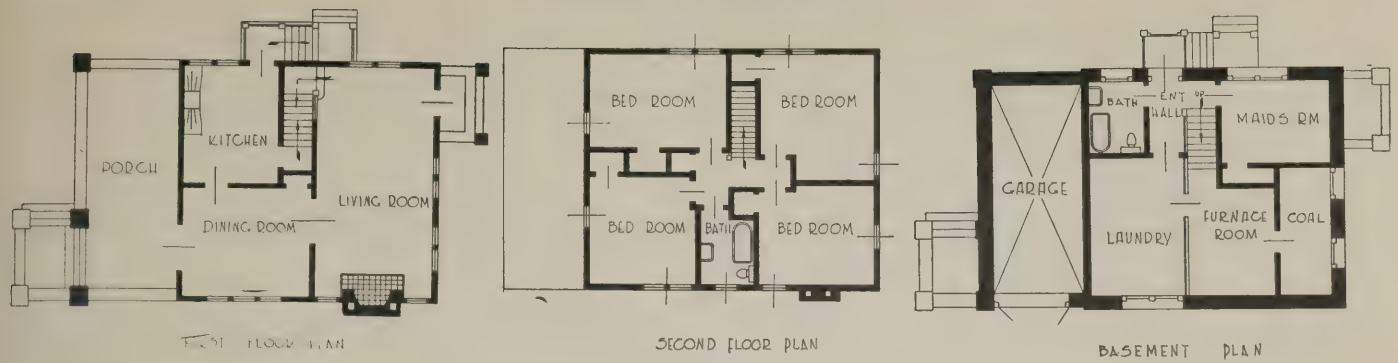
Elevations and plans of House No. 3. See photo reproduction on page 33 of Style Sheet

Side elevation of House No. 4

Brooklyn, N. Y., and studied both craftsmanship and architecture. With that fundamental training he soon found an opportunity to exercise his initiative. A very few years ago, with a capital of about $6,000—just about enough to finish one house—he began designing and building homes.

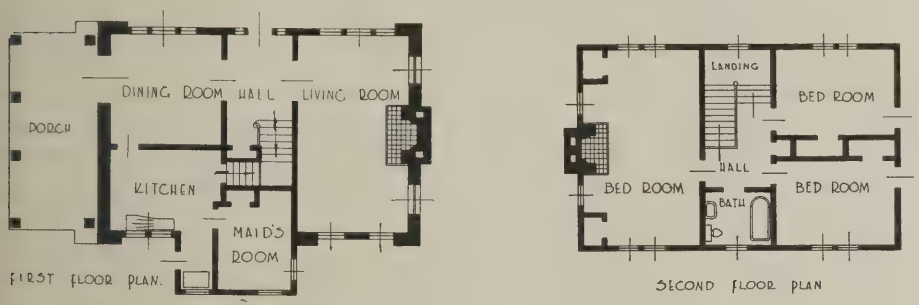
Mr. Magill had not only a fundamental education in carpentry and house architecture and native initiative, but he had an *idea*. He realized that there are in every big city a great many salaried men who accumulate families and get tired of apartment-house or city flat life; yet who, for one good reason or another, do not want to *buy* suburban homes. And there are many good reasons why employes in big corporations

Side and front elevation of House No. 4



Floor plans of House No. 4

Elevations of House No. 8

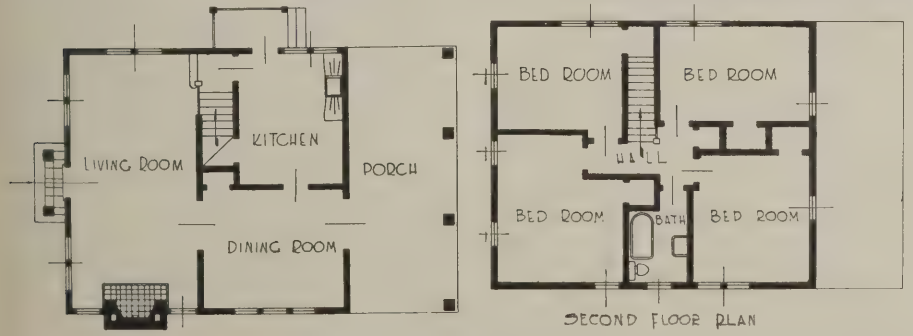


Floor plans of House No. 8

with offices and branches in many cities, do not like to buy homes, however much they may be sold on suburban life.

Mr. Magill then set himself to the problem of supplying homes to this class of home believers. By purchasing land in large plots and developing the plots as a whole he was able to buy real estate to advantage, and he was able to develop his property in large units and not merely as individual

Elevations of House No. 9. See halftone illustration, page 35 of Style Sheet



Floor plans of House No. 9

narrow building lots. For example, building a group of houses forming a hollow square made it possible to develop the interior of the square as a community park or playground, and thus add many attractive advantages over the usual "backyard" with fences and ash cans.

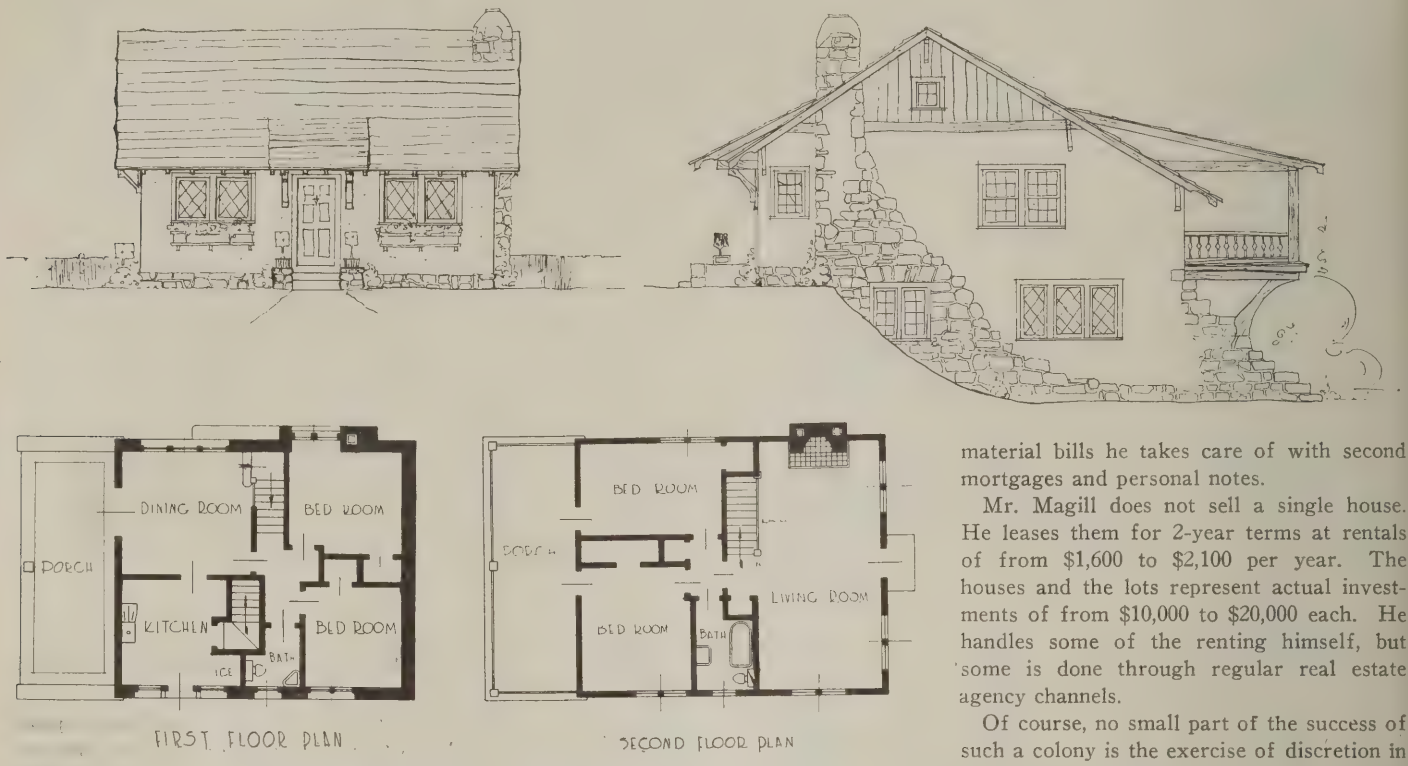
The houses themselves nestle into the landscape as if they were a natural part of it. They show originality of design, inside and out. They are designed to attract attention as well as to be real "homey homes."

They have to sell themselves, although they can't be bought.

Builds, Leases and Operates

Mr. Magill has no building organization of his own, but buys all the materials and equipment. He sublets the work like masonry, plastering, electric wiring, plumbing, etc., in separate contracts.

He finances his house construction by first and second mortgages on houses as fast as they are completed. He finances his mortgages through a Westchester county trust company which charges 3½ per cent commission and 6 per cent interest. Some of his material bills he takes care of with second mortgages and personal notes.



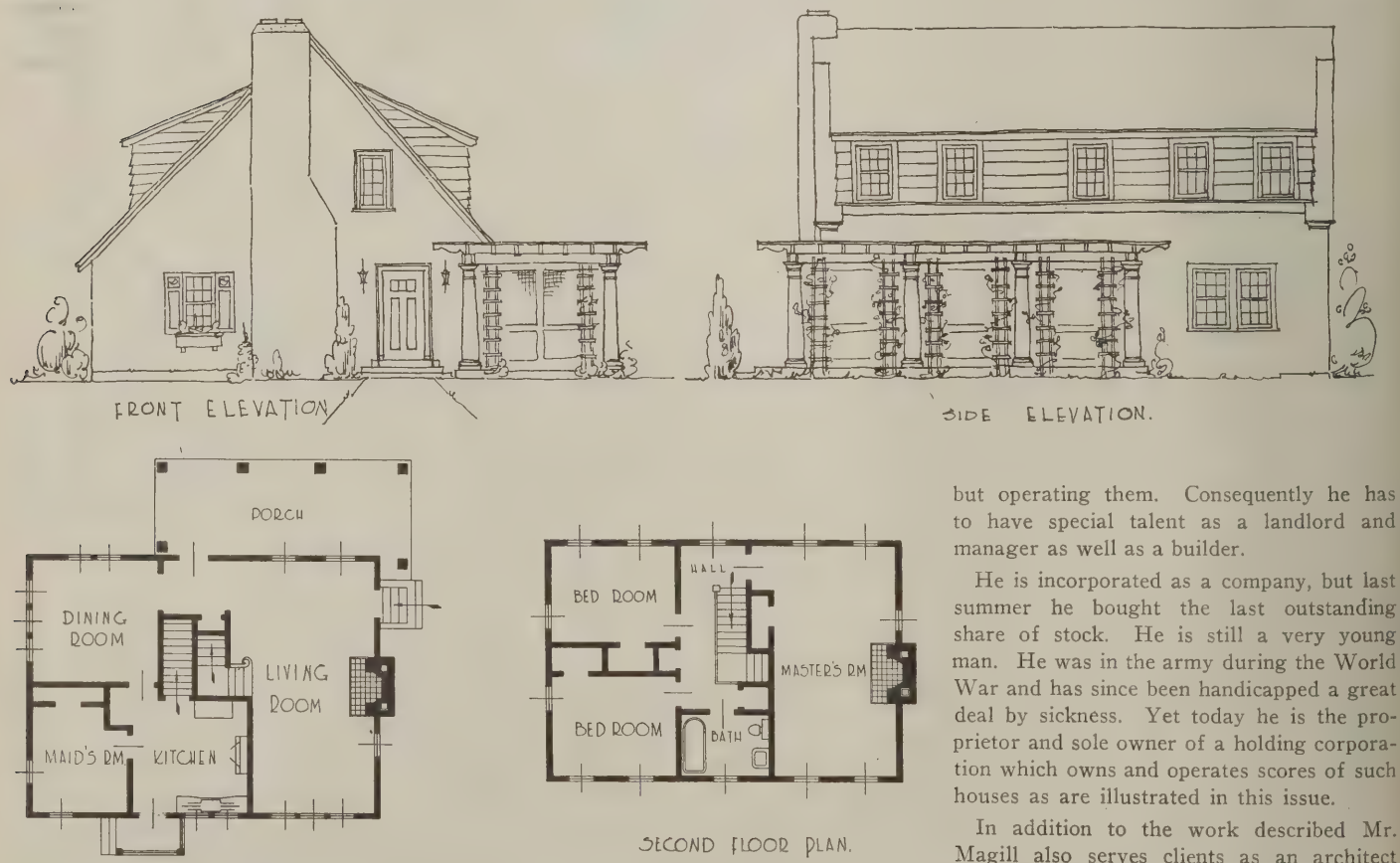
Elevations and plans of House No. 10

Mr. Magill does not sell a single house. He leases them for 2-year terms at rentals of from $1,600 to $2,100 per year. The houses and the lots represent actual investments of from $10,000 to $20,000 each. He handles some of the renting himself, but some is done through regular real estate agency channels.

Of course, no small part of the success of such a colony is the exercise of discretion in making leases. He is not selling the houses, but operating them. Consequently he has to have special talent as a landlord and manager as well as a builder.

He is incorporated as a company, but last summer he bought the last outstanding share of stock. He is still a very young man. He was in the army during the World War and has since been handicapped a great deal by sickness. Yet today he is the proprietor and sole owner of a holding corporation which owns and operates scores of such houses as are illustrated in this issue.

In addition to the work described Mr. Magill also serves clients as an architect and building contractor.



Elevations and plans of House No. 13

Making Living Room Stools

By James Hart Dunlop

THE accompanying illustrations show a very useful pattern of stool for every-day use.

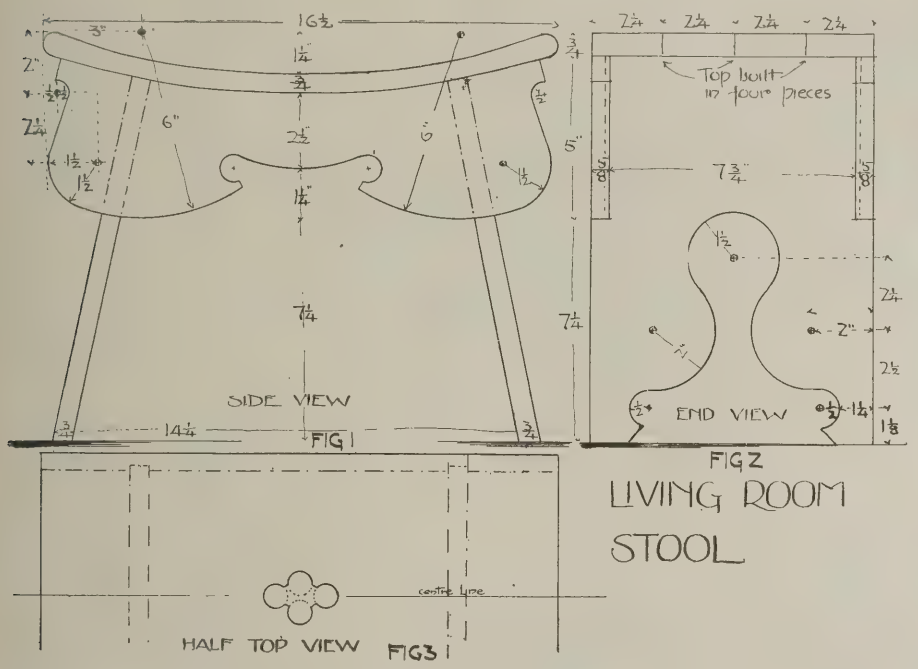
The lower stool is 16½ in. long, 9 in. broad and 13 in. high, and the top stool is 13½ in. long, 8 in. broad and 11½ in. high.

These stools are built with circle seats, adding very much to their appearance and to the comfortableness of the seat.

A line drawing is shown of the largest pattern in which the centers are given for the mark off of the patterns for the sides and legs.

The top is built in four strips 2¼ in. broad and is cut from a piece of wood 2½ in. thick, which allows ample space for jointing.

The most economical way to cut out the top is to get a piece of a batten end 16½ in. long, 7 in. broad and 2⅜ or 2½ in. thick and have it planed up true on all sides. Make a template for the edge of the seat, as shown in the side view, and mark off this shape four times on the broad side of the piece of wood. Remember to leave sufficient room between the several pieces to allow the saw to cut between without changing the shapes. Take the piece of wood and put it into the bench grip in an upright position and where the lines of the patterns on the side meet the end of the wood square the marks across. Do this on both ends before starting to saw out with the bow saw.



Construction dimensions for stools for every-day use. Fig. 1—Front view of stool. Fig. 2—End view of stool. Fig. 3—Half plan

Fig. 4—Pair of stools made from drawing

Each piece should now be cut out carefully just saving the mark so that there will be a little left for cleaning up on both sides. The pieces should now be cleaned up on both sides to the shape of the pattern. When this has been done joint up the edges with a trying plane and glue each piece together. After the joints have been coated with the glue, put one of the pieces in the grip and rub the joints together. Give six or seven steady rubs backwards and forward and just as the last one is being completed see that the two pieces are brought exactly together.

This same operation can now be gone through with the other two pieces, and while the two joints are hardening we can be going on with the sides and the legs.

The wood for these parts will be planed up to the sizes given, and in this case we will just set off the size and shape on the material, as after cutting the one leg or side we can mark off the remaining one from it.

Fig. 5—Stool with sides and legs nailed together ready for top

Once the patterns have been set off, the first thing to be done, if a few ogee bits are at hand, is to bore out the small circles. For the legs the two small circles at the bottom can be cleared out, and I always like to cut the top curve with an expansion bit. This simplifies the cut-out very much and it also makes the paring and cleaning out of the shaped edges a very easy matter.

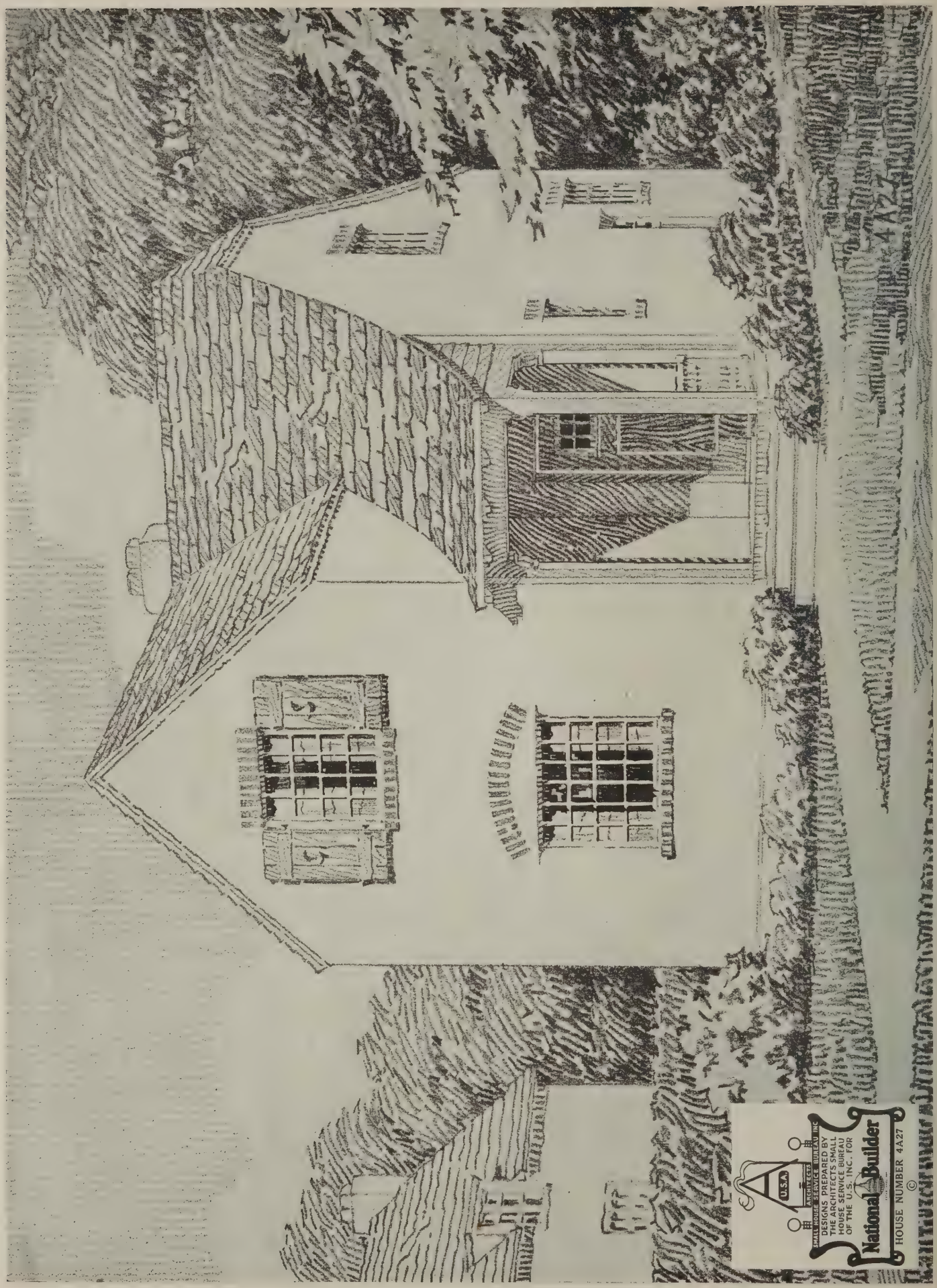
By this time probably the glued joints will be hard and we can joint what is now the two parts of the top together and glue as before.

The checks are next to be taken out for the sides which go flush with the edges of the legs. These portions should be gaged, and after they have been sawed across, ripped down the gage mark to the bottom of the checks. The side portions are now marked out and the few small circles bored out as a beginning for the shaping. Saw out the remaining curves with the bow saw and clean up the edges. The five portions of the stool are now ready to be cleaned off and sandpapered on their surfaces.

Take the legs and sides and fit and nail them together, as shown in the illustration of the stool ready for top. (See Fig. 5.)

The sides of the stools would next be polished up flush with sandpaper, after which the top is fitted.

The top of the stool is cut on the ends to the exact length, the finger holes bored and cut out and the whole thing finished up and sandpapered. Nail the top in position and give a coat of stain and finish with varnish.



A Four-Room Tile and Stucco House for a Narrow Lot

A Four-Room Tile and Stucco House for a Narrow Lot

House No. 4A27 Designed for National Builder by the Regional Service Bureaus of The Architects' Small House Service Bureau of the United States. This House Prepared by the Northwestern Division Regional Bureau

Copyright, 1923, Jointly by National Builder and The Architects' Small House Service Bureau of the United States

THIS design provides an attractive small home for a narrow lot. It will also contain the convenience and comfort demanded by the American home builder.

This four-room house can be built nicely upon a 30 ft. frontage, as the house is but 22' wide x 29' 6" deep. It is of tile construction with stucco exterior and shingle roof. The brick trim around the many-paned casement windows add distinction to the exterior. The plant provides for steel casement sash, but an alternate detail is provided for wooden sash if desired.

The surprising feature of the first floor is the specious effect obtained by the skillful arrangement of rooms. The entrance hall is large enough to be an entrance hall with diginity, yet it wastes no space. The kitchen is small, but compact and carefully designed for ease of housework. A large dining alcove with two windows serves in place of a dining room. It is noticeable that there is no waste space anywhere, and that the rooms are of good size, nicely proportioned and well located.

On the second floor there are two good bedrooms, a bath and linen closet and a towel closet in the hallway. The sleeping accommodations can be increased practically to three bedrooms, as the coat closet in the entrance hallway is so designed that it can be converted into a closet bed. This is provided as an alternate in the plans.

The plan provides a complete basement with well lighted laundry.

This house can face east or south, and can be reversed for other facings. Reversed plans are provided without extra charge.

The regular price for this plan is $20. Half rate to NATIONAL BUILDER subscribers.

Specifications and Quantity Survey

EXCAVATING: 150 cu. yds.

BACK FILL: 30 cu. yds.

FOUNDATION:

If 12" concrete, 38 cu. yd. gravel, 154 sax cement
If 9" concrete, 30 cu. yd. gravel, 122 sax cement
If 12" tile, 17,500 CBM tile, 12 cu. yds. mortar
If 9" tile, 13,600 CBM tile, 10 cu. yds. mortar
100 face brick
5 lb. mortar color

WALLS:

20,300 CBM tile
21 cu. yds. mortar
340 face brick
10 lb. mortar color
7,000 common brick

CEMENT FLOORS:

4 cu. yds. gravel
3 cu. yds. sand
43 sax cement
4 cement spatter blocks
18 lin. ft. cement steps

CHIMNEY:

3200 common brick
100 fire brick
180 inside face brick
24 sq. ft. hearth tile
56 lin. ft. 8x12 flue tile
20 lb. fire clay
3 cu. yds. mortar
1—cast iron ash dump
1 throat and damper
1 angle 4x3x5/16
2—8x12 cleanouts
1—8" thimble
7 yds. metal lath

LATH: 8500M lath

PLASTER:

560 yds. plaster on wood lath
9 yds. plaster on wire lath over boiler
16 yds. Keene's cement

STUCCO: 200 yds. stucco on tile

TILE FLOOR:

40 sq. ft. ceramic tile
28 lin. ft. tile cove base

LUMBER:

2—6x 6- 7 posts
1—6x10-24 girder
3—2x10-16 stair horses
3—2x 6-14 landing framing
2—2x 4-14 basement partition plates
1—2x 4- 8 basement partition studs
140 ft. D&M basement partition sheating
4 ft. plank clean out cover
5—2x10-14 first floor joist
18—2x10-22 first floor joist
2—2x10-22 first floor joist doubles
1—2x10-14 first floor joist doubles
3—2x10-12 headers
640 ft. com. bds. first floor sub-floor
840 ft. 13/16x1½ finish first floor
230 lin. ft. 1x4 bridging
108—1x2-16 outside wall stripping
300 ft. No. 1 bds. for grounds
3—2x10-14 second floor stair horses
8—2x 4-12 first floor bottom partn. plates
84—2x 4- 9 first floor partition studs
12—2x 4-16 first floor top partition plates
4—2x 4-14 opening doubles and headers
22—2x10-22 second floor joist
4—2x10-14 second floor headers
640 ft. com. bds. second floor subfloor
800 ft. 13/16x1½ second floor finish floor
32—2x 4- 9 ceiling joist and ties
9—2x10-12 wall plates
2—2x 4-16 gable studs, etc.
12 ft. siding
24—2x6-12 rafters
24—2x6-16 rafters
7—2x6-22 rafters
7—2x6-18 rafters
42 lin. ft. 1x10 ridge rafter
25—2x 4-16 braces and etc.
12—2x 6-16 scaffold
10—2x 8-16 scaffold
4—2x10-16 scaffold
12—2x 4-16 scaffold
1200 ft. com. bds. roof sheating
9½M shingles

LINTELS:

160 lin. ft. 3x3x¼" angles
14—⅜ rods, 5'0 for platform

MILLWORK—Frames:

5 window frames 8x10-3L-1⅜

Windows and Sash:

5 sash 8x10-3L-1⅜

Storm Sash:

5 storm sash 8x10-3L-1⅜

Screens:

5 screens 8x10-3L-1⅜

Shutters:

1 pr. shutters for Mullion No. 5 opening

Outside Doors:

1 dr. fr. 3'0x7'0-1¾
1 dr. fr. 2'8x7'0-1¾
1 icing door frame
1 door 3'0x7'0-1¾ No. 1246 Glazed DSA
1 door 2'8x7'0-1¾ No. 753 DSA
1 icing door

Storm Doors:

1 st. dr. 3'0x7'0-1⅛
1 st. dr. 2'8x7'0-1⅛

Screen Doors:

1 sc. dr. 3'0x7'0-1⅛
1 sc. dr. 2'8x7'0-1⅛

Steel Windows:

4 type 1—1 unit- 6 lt.-RH-Operative
4 type 2—2 unit-12 lt.-2LH-2RH-1 oper. 1 fixed
1 type 3—3 unit-24 lt.-1LH-1RH-2 oper. 1 fixed
3 type 4—2 unit-16 lt.-RH-1 oper. 1 fixed
2 type 5—2 unit-16 lt.-1RH-1LH-2 oper.

Storm Sash:

4 storm sash, type 1
4 storm sash, type 2
1 storm sash, type 3
3 storm sash, type 4
2 storm sash, type 5

Screens:

4 screens, type 1
4 screens, type 2
1 screen, type 3
3 screens, type 4
2 screens, type 5

Outside Millwork:

142 lin. ft. cornice
1 porch post
11 lin. ft. porch facia
4 porch brackets
4'6 lin. ft. porch rail and balusters
24 lin. ft. porch cove
5 dentals for entrance cornice

Interior Doors:

2 doors 2'6 x7'0-1⅜ No. 1102
1 door 2'10x7'0-1⅜ No. 1102
1 door 2'8 x7'0-1⅜ No. 1102
3 doors 2'6 x6'8-1⅜ No. 1102
2 doors 2'6 x5'8-1⅜ No. 1102
1 door 2'6 x6'2-1⅜ No. 1102
1 door 1'8 x2'6-1 panel

Jambs:
2 jambs 2'6 x7'0
1 jamb 2'10x7'0
1 jamb 2'8 x7'0
3 jambs 2'6 x6'8
2 jambs 2'6 x5'8
1 jamb 2'6 x6'2
1 jamb 1'8 x2'6

Interior Trim:
5 side trim 8x10-3L
1 side trim 3'0x7'0
1 side trim 2'8x7'0
1 side icing door trim
4 sides type 1 window trim
4 sides type 2 window trim
1 side type 3 window trim
3 sides type 4 window trim
2 sides type 5 window trim
4 sides 2'6 x7'0 dr. trim
2 sides 2'10x7'0 dr. trim
2 sides 2'8 x7'0 dr. trim
6 sides 2'6 x6'8 dr. trim
4 sides 2'6 x5'8 dr. trim
2 sides 2'6 x6'2 dr. trim
1 side 1'8 x2'6 dr. trim
1 flight basement stairs with rail
1 flight main stairs with rail
1 mantle shelf
1—3'6 book case
1—3'6 cupboard
1 drain board
1—3'0 cupboard
1 dining alcove seat with table
1 towel cabinet
1 medicine cabinet No. 2835
20 lin. ft. closet shelving
20 lin. ft. closet hook strip
84 lin. ft. ceiling cove
180 lin. ft. picture moulding
450 lin. ft. base
450 lin. ft. base shoe
450 lin. ft. base moulding
6 lin. ft. threshold
87 lin. ft. chair rail
20 lin. ft. clothes rod
1 meter cabinet

HARDWARE:
5 cellar sash sets
19 storm sash sets
19 screen sash sets
2 set shutter hardware
1 front door set with butts
1 rear door set with butts
1 icing door set with butts
2 storm door sets
2 screen door sets
1 floor hinge
2 push plates
9 inside door sets with butts
4 friction stays for utility door
12 door bumpers
4 stair brackets
6 pr. ornamental butts } kitchen cupboard
3 cupboard turns
3 elbow catches
2 brackets
2 drawer pulls
6 pr. ornamental butts } kitchen cupboard
3 cupboard turns
3 elbow catches
2 drawer pulls
1 pr. ornamental butts } medicine cabinet
1 cupboard turn
1 cupboard turn
1 pr. ornamental butts } towel cabinet
1 pr. ornamental butts } meter cabinet
1 cupboard turn
4 doz. clothes hooks
1050 lb. assorted nails
6 lb. brads
1 coal chute
2 pr. ornamental butts } book case
1 cupboard turn
1 elbow catch

TINWORK:
42 lin. ft. ridge roll
3 finials
84 lin. ft. flashing
300 tin shingles
4 sheets sheet tin
50 lin. ft. valley tin
50 lin. ft. gutter
11 gutter ends
7 nipples
7 offsets
7 elbows
7 strainers
24 gutter hangers
72 lin. ft. conductor pipe
15 conductor hooks
20 lin. ft. 3" vent pipe

EXTERIOR PAINTING:
6 gal. trim paint
2 gal. boiled oil
34 gal. shingle stain
½ gal. screen paint
1 gal. sash paint
¼ gal. shellac
1 gal. japan
10 lb. putty
¼ gal. metallic paint

INTERIOR PAINTING:
12 gal. white paint
9 gal. enamel
6 gal. filler stain
3 gal. shellac
12 gal. interior varnish
4 gal. shellac for floors
7 gal. floor varnish
2 gal. oil
1 gal. japan
2 gal. turpentine
1 gal. alcohol
4 doz. sheets sandpaper
3 lb. steel wool

PAPER:
3 rolls tar felt for roof
3 rolls red rosin for floors

CAULKING:
19 window openings
2 door openings
1 icing opening
1 coal chute

HEATING:
1 complete hot air heating plant, 15,000 cu. ft. capacity complete with hot and cold air ducts and base registers

PLUMBING:
1 sewer and water service
1 two part laundry tub
1 floor drain
1 cleanout pit
1 hot water tank with coil
1 sink
1 closet
1 lavatory
1 tub
1 refrigerator drain
2 sill cocks
With complete roughing in material for drainage and ventilation

WIRING:
1 bell and buzzer
1 main service outlet
8 base outlets
1 power outlet
3 gas outlets
13 light outlets
4 three-way outlets
8 switch outlets

MATERIALS		ELECTRIC WIRING SYMBOLS			
CONCRETE		CEILING OUTLET		3 WAY SWITCH	
BRICK		DROP CORD		GAS OUTLET	
WOOD		BRACKET		PUSH BUTTON	
PLASTER		BASE PLUG		BELL OUTLET	
TILE		SWITCH		BUZZER	

Dimensions are taken to outside of foundation walls, to outside of studs on exterior walls and centers of studs for partitions.

Foundation walls shown concrete may be stone, brick, concrete block or load bearing hollow tile.

Where building ordinances permit, foundation walls may be 9 in. thick (with 20x9-in. footings) except in case of stone, which shall be 18-in. thick.

Stock numbers refer to mouldings in Universal Millwork Design Book No. 20. In case these mouldings can not be procured, others of similar design and size may be substituted.

Provide 1⅛-in. screen and storm sash for all exterior openings except ice door unless otherwise noted. Bottom rail of storm sash to have vent.

Building Shows

FOLLOWING is a list and dates of the building shows that will open the building season of 1923:

"Better Homes Exposition," Broadway Auditorium, Buffalo, N. Y., week of March 19, 1923. Held under auspices of the Buffalo Real Estate Board; Miss Laura A. Longbine, secretary, 134 Franklin Street, Buffalo.

Duluth Building Show, April 2-7, 1923, Duluth, Minn. Care of Chairman, M. A. Dunning, Duluth Builders' Exchange.

"Home Beautiful Exposition" Mechanics Building, Boston, April 21 to May 5, 1923. Care of Manager, Chester I. Campbell, 5 Park Square, Boston.

Kansas City Building Show, February 5-10, 1923, Convention Hall, Kansas City, Mo., under auspices of Real Estate Board of Kansas City. Thos. L. Healy secretary, 917 Baltimore Avenue, Kansas City.

Minneapolis Building Show, March 19-24, 1923, Kenwood Armory, Minneapolis. C. A. Gunn, secretary.

"Own Your Home Exposition," April 21-28, 1923, Sixty-ninth Regiment Armory, New York City. Robt. H. Sexton, manager, 512 Fifth Avenue, New York City.

"Own Your Home Exposition," March 24-31, 1923, Coliseum, Chicago. Headquarters, 111 W. Jackson Boulevard, Chicago.

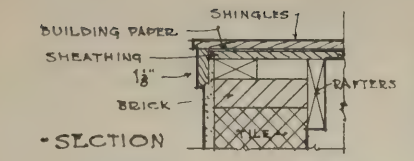
Pittsburgh Building Show, Motor Square Garden, March 26-31, 1923. Held under auspices of Pittsburgh Builders' Exchange.

St. Paul Building Show, February 12-16, 1923.

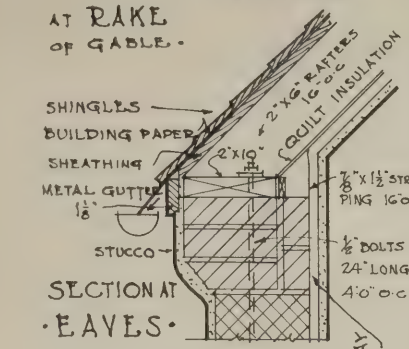
"Better Homes Exposition," Rose Building, Cleveland, April 4-14, 1923, at Public Auditorium. Ralph P. Stoddard, secretary.

Wages Boosted in Lumber Industry

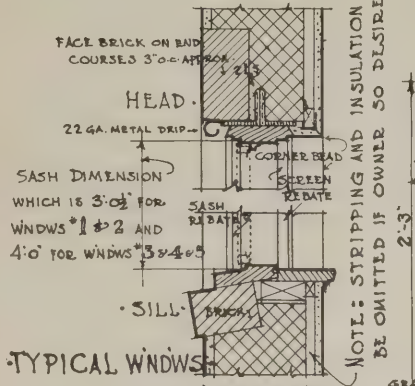
WAGES are from 45 to 50 per cent higher; logs are bringing twice the price they brought last year and the lumber industry as a whole is 50 per cent better in upper Michigan, according to M. J. Rice of the Boniface Lumber Company of Iron Mountain. He said the outlook for timber production assures twice the volume of last season. Last year birch logs brought $18 a thousand and now loggers are getting $30. Woods workers are receiving $40 a month and board, while last year they got $26. Mr. Rice says that despite the boost in wages, there is a pronounced shortage of men.



• SECTION AT RAKE of GABLE •



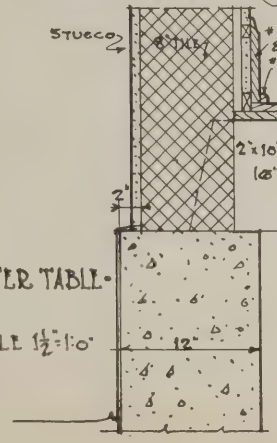
SECTION AT • EAVES •



SASH DIMENSION WHICH IS 3'-0½" FOR WINDWS #1 & 2 AND 4'-0" FOR WINDWS #3 & 4 & 5

• TYPICAL WNDWS •

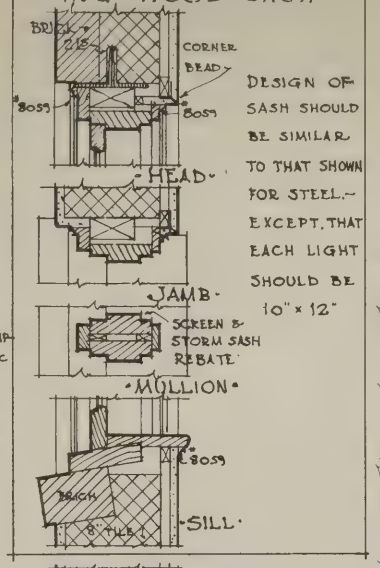
NOTE: STRIPPING AND INSULATION MAY BE OMITTED IF OWNER SO DESIRES



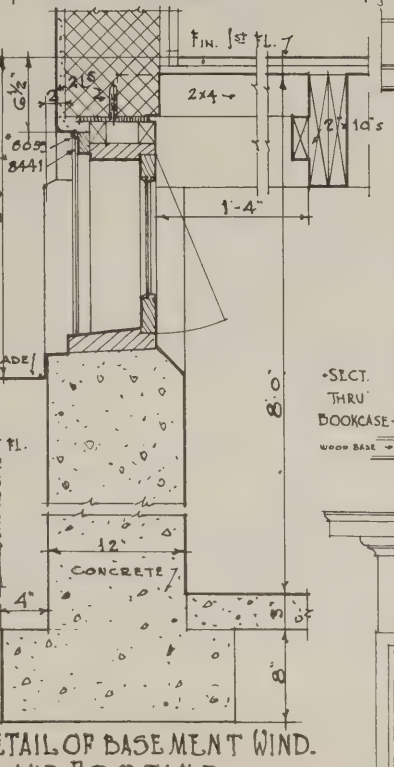
• WATER TABLE •

SCALE 1½"=1'-0"

• ALTERNATE DETAIL OF WINDOWS SHOWING WOOD SASH •



DESIGN OF SASH SHOULD BE SIMILAR TO THAT SHOWN FOR STEEL.— EXCEPT THAT EACH LIGHT SHOULD BE 10" x 12"



• DETAIL OF BASEMENT WIND. AND FOOTING •

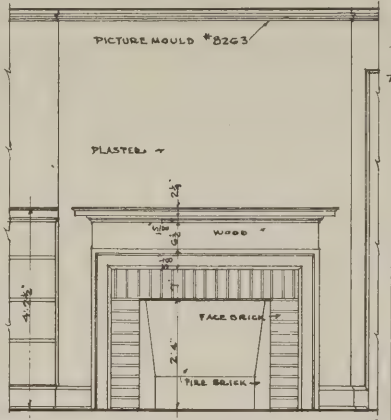
SCHEDULE OF DOORS

QUANTITY	TYPE	SIZE	DESCRIPTION	REMARKS
1	A	3'-0" x 7'-0" x 1¾"	UNIV. 1246	Glazed-D.S.A.A.
2	B	2'-6" x 7'-0" x 1⅜"	" 1102	
1	C	2'-10" x 7'-0" x 1⅜"	" "	
1	D	2'-8" x 7'-0" x 1⅜"	" "	
1	E	2'-8" x 7'-0" x 1¾"	" 753	Glazed D.S.A.A.
3	F	2'-6" x 6'-8" x 1⅜"	" 1102	
2	G	2'-6" x 5'-8" x 1⅜"	" "	
1	H	2'-6" x 6'-2" x 1⅜"	" "	
1	I	1'-8" x 7'-0" x 1⅜"	1 PANEL	

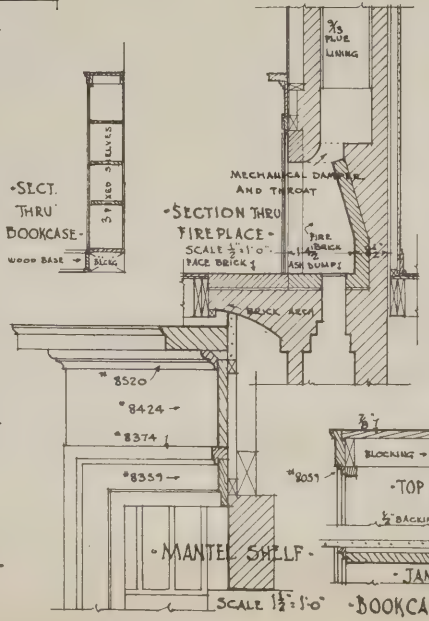
SCHEDULE OF WINDOWS

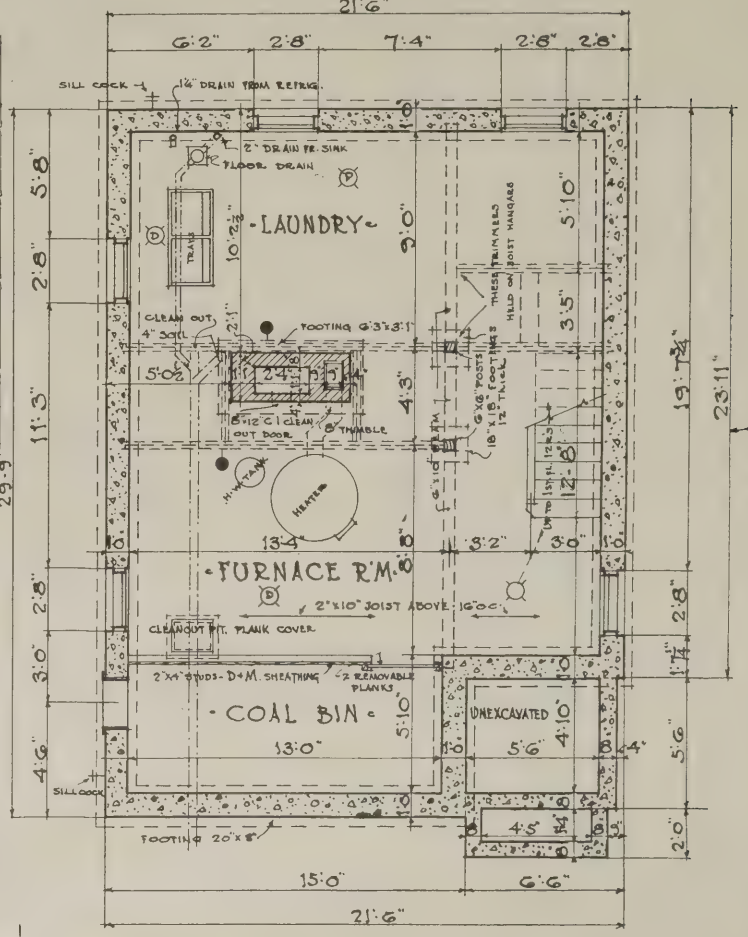
QUANTITY	TYPE	MAT'L	DESCRIPTION	NO. OF LIGHTS	SWING
4	1	STEEL	1 UNIT - OPERATING	6	R.H.
4	2	"	2 UNITS 1 FIXED 1 "	12	2 L.H. 2 R.H.
1	3	"	3 " 1 " 2 "	24	1 L.H. 1 R.H.
3	4	"	2 " 1 " 1 "	16	R.H.
2	5	"	2 " 2 "	16	1 R.H. 1 L.H.
5	BASMT	WOOD	3 LIGHTS, 8"x10" - 2'-4"x1'-3"x1⅜" SASH - SEE DETAIL		

NOTE: ALL OPENINGS IN MASONRY WALLS TO HAVE 2-3"x3"x¼" IS FOR LINTELS •



ELEVATION of FIREPLACE
SCALE ½"=1'-0"





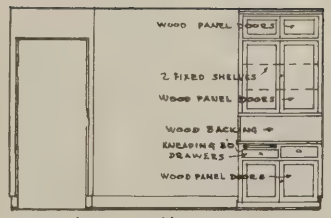
BASEMENT STAIRWAY TO HAVE #1984 NEWEL POST, #2040 HANDRAIL, AND #2007 BALUSTERS, ONE TO EACH TREAD

BASEMENT PLAN

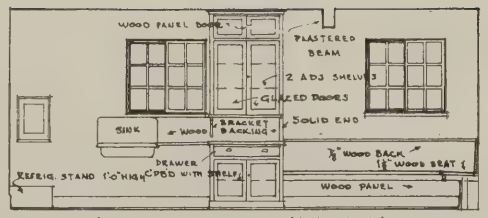
SCALE ¼"=1'-0"

Scale reduced one-half

U.S.A.
ARCHITECTS
SMALL HOUSE SERVICE BUREAU INC
DESIGNS PREPARED BY THE ARCHITECTS SMALL HOUSE SERVICE BUREAU OF THE U.S. INC. FOR
National Builder
HOUSE NUMBER 4A27
©

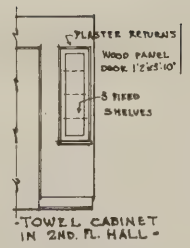


· FRONT WALL OF KITCHEN ·

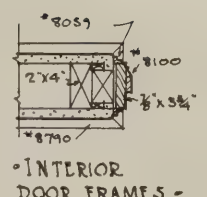


SCALE ¼"=1'0"

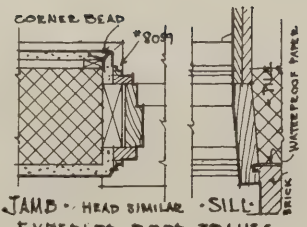
· REAR WALL OF KITCHEN ·



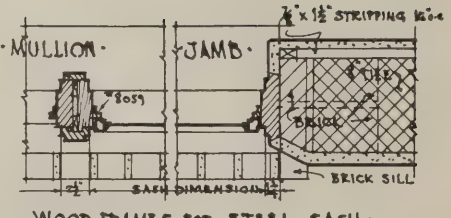
· TOWEL CABINET IN 2ND. FL. HALL ·



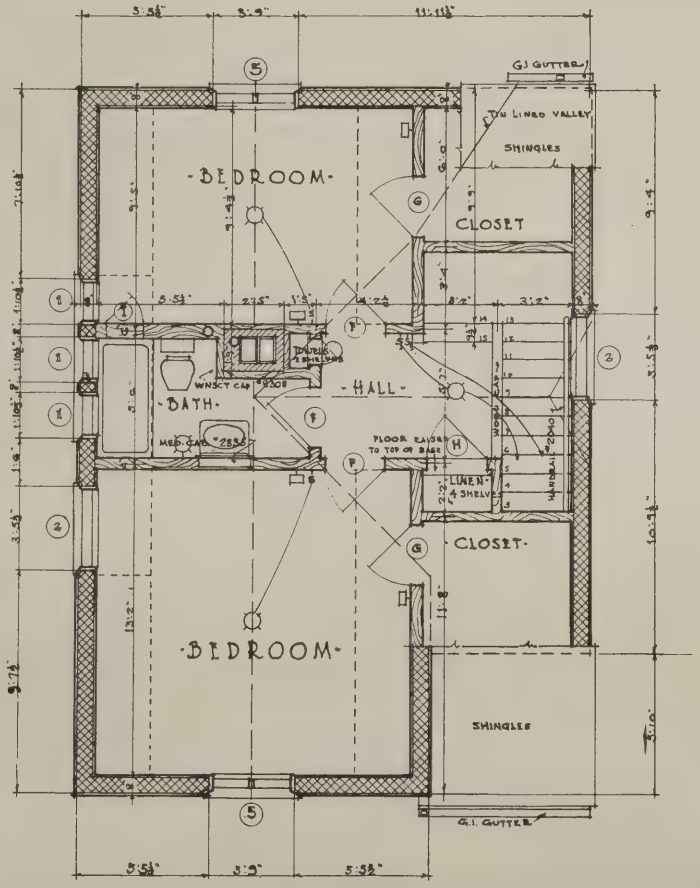
· INTERIOR DOOR FRAMES ·
SCALE 1½"=1'0"



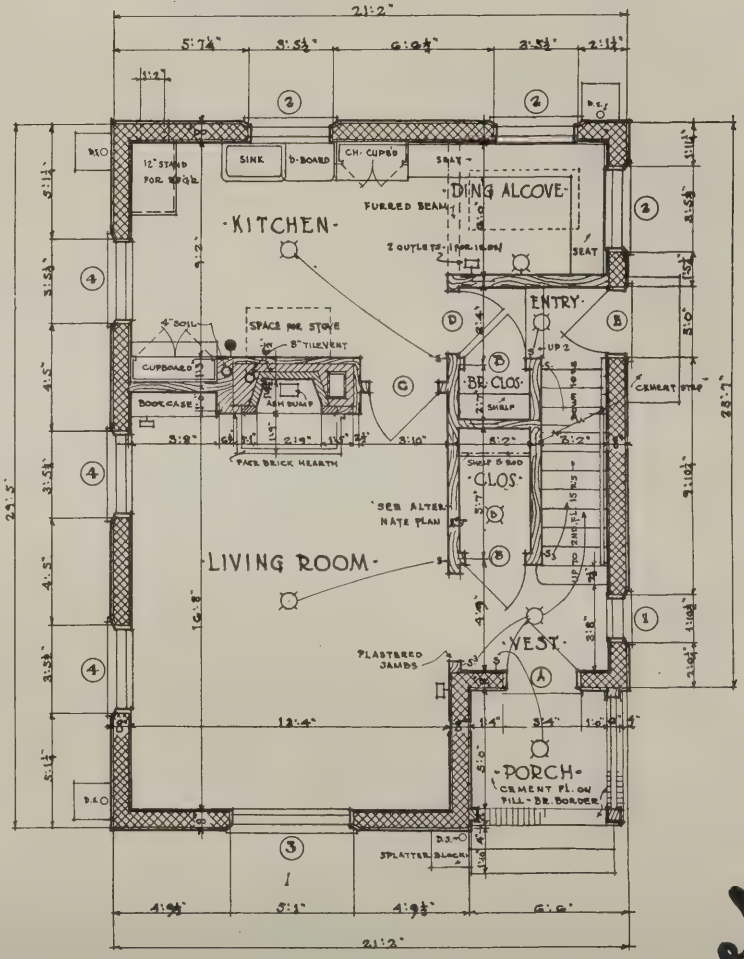
· JAMB · HEAD SIMILAR · SILL ·
· EXTERIOR DOOR FRAMES ·



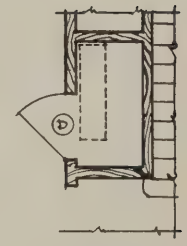
· WOOD FRAMES FOR STEEL SASH ·



· SECOND FLOOR PLAN ·
SCALE ¼"=1'0"



· FIRST FLOOR PLAN ·
SCALE ¼"=1'0"



· ALTERNATE PLAN OF COAT CLOS. SHOWING ARRANGEMENT TO ACCOMODATE A CLOSET BED

Scale reduced one-half

U.S.A.
ARCHITECTS
SMALL HOUSE SERVICE BUREAU INC.
DESIGNS PREPARED BY THE ARCHITECTS SMALL HOUSE SERVICE BUREAU OF THE U.S. INC. FOR
National Builder
HOUSE NUMBER 4A27
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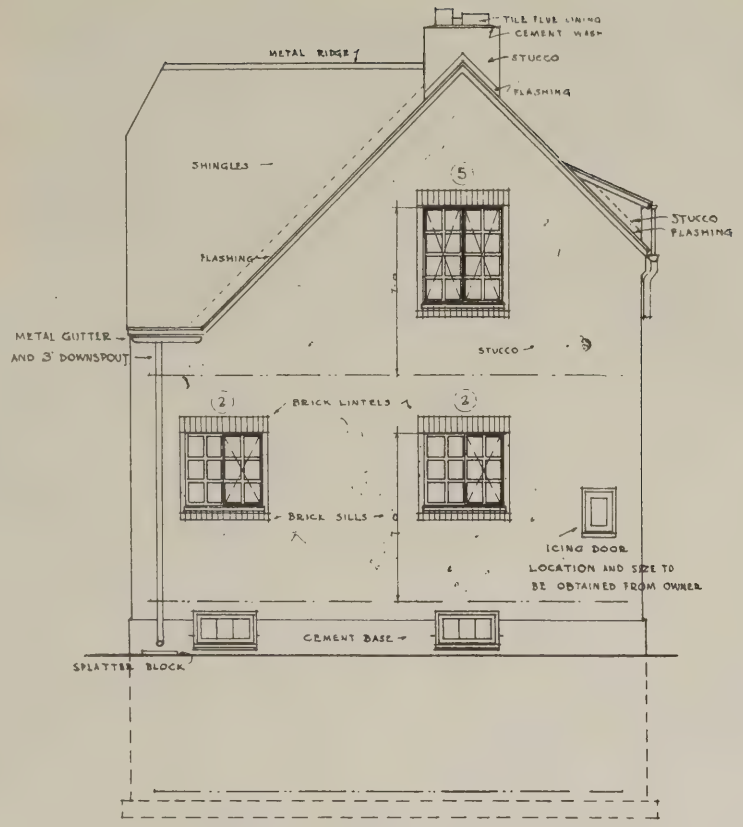
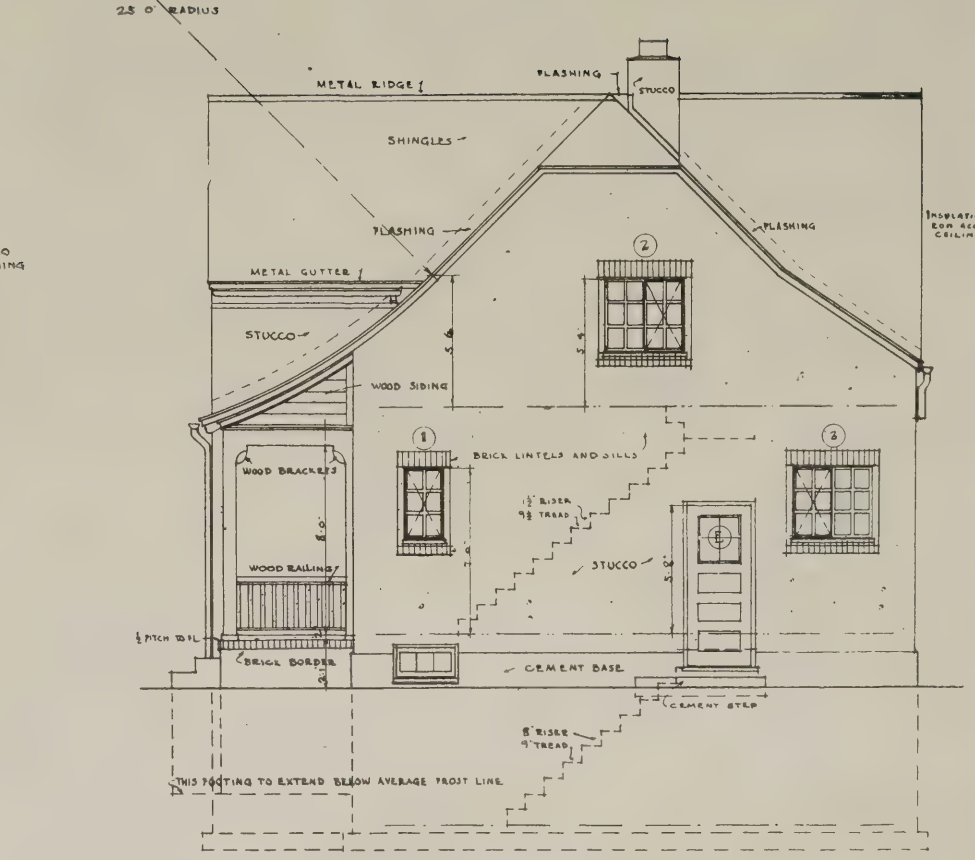


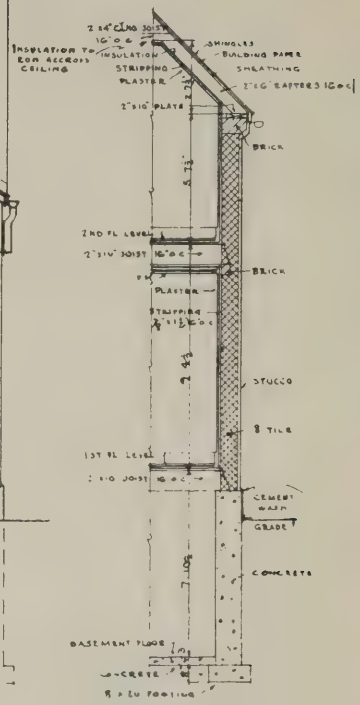
·REAR ELEVATION·

SCALE ¼"·1'·0"



·SIDE ELEVATION·

SCALE ¼"·1'·0"



TYPICAL WALL SECTION

SCALE ¼"·1'·0"

U.S.A.
ARCHITECTS
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DESIGNS PREPARED BY
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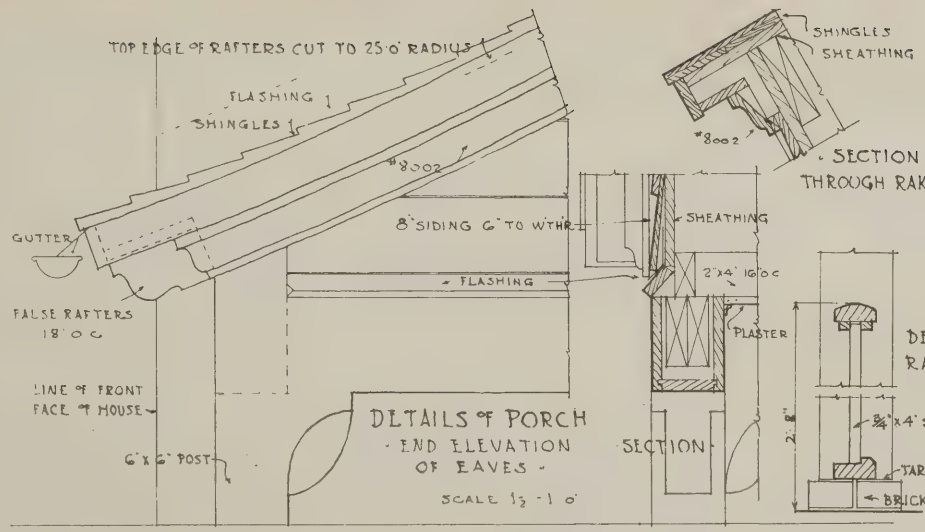
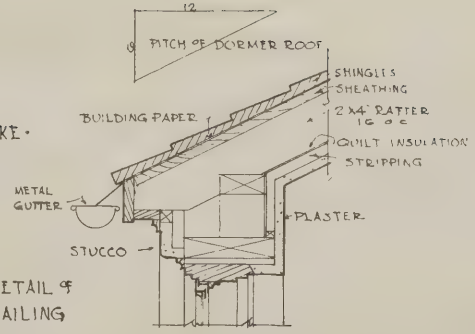
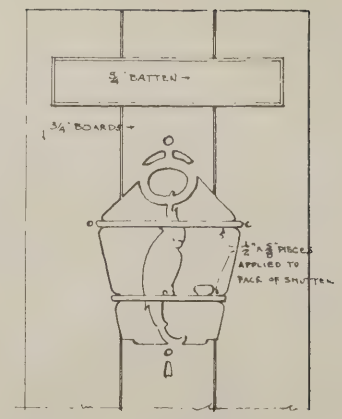
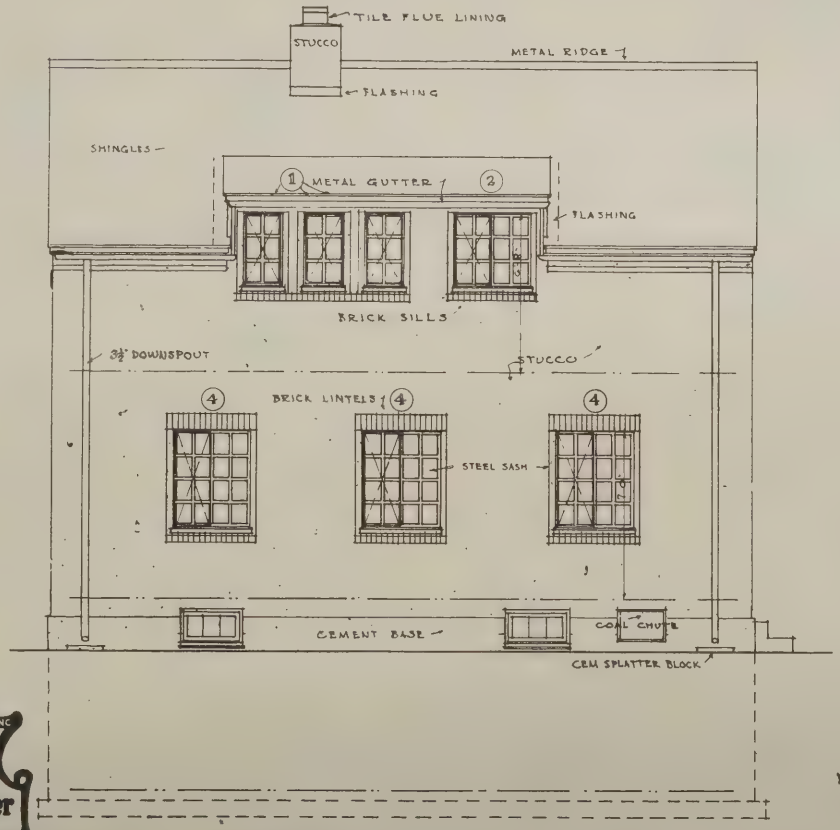
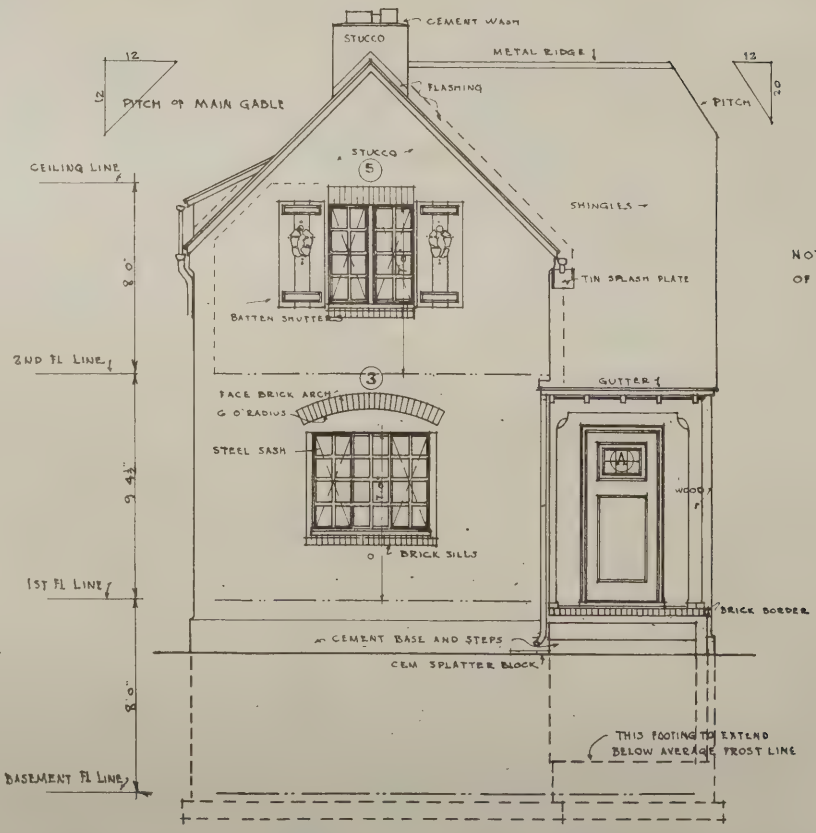
Scale reduced one-half











NOTE OPERATIVE SECTIONS OF STEEL SASH MARKED THUS.

U.S.A. ARCHITECTS
SMALL HOUSE SERVICE BUREAU INC
DESIGNS PREPARED BY THE ARCHITECTS SMALL HOUSE SERVICE BUREAU OF THE U.S. INC. FOR
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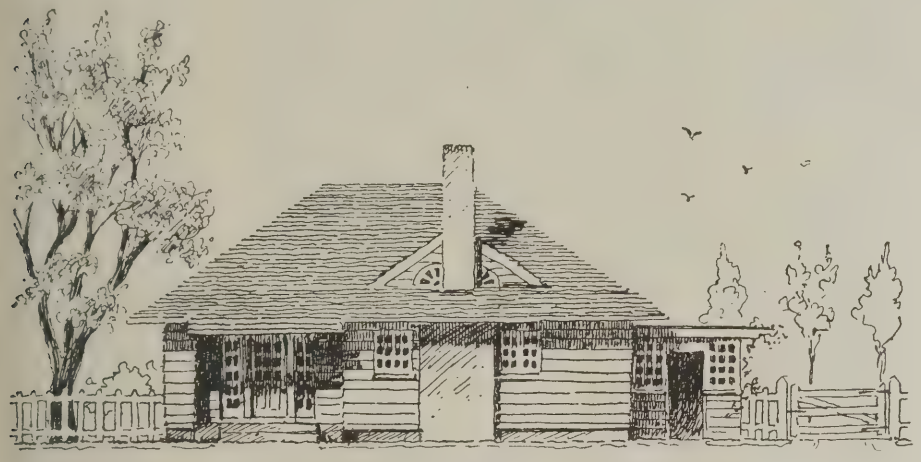
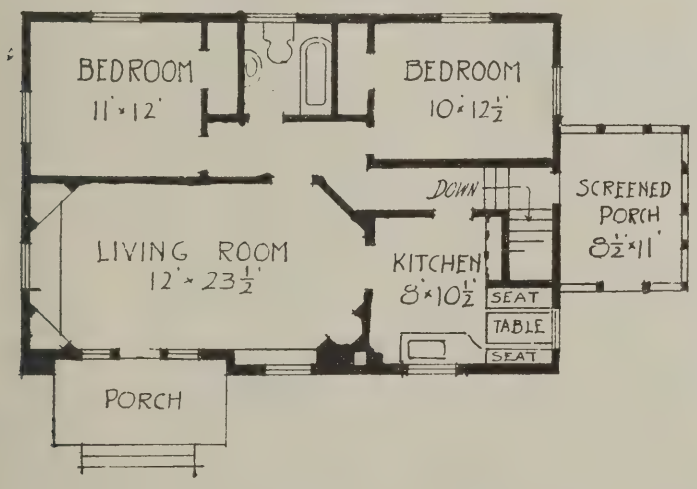
A Bungalow for the Farm

ONE of the problems which the builder or architect has to face in consultation with a customer is to give him what he only thinks he wants or take the responsibility of persuading him to decide on what he ought to have. There are occasions in which no matter what course is adopted it might have been better for the builder to have adopted the reverse. D. Williamson, farm architect, writing in the *Pennsylvania Farmer*, says: "Two years ago I happened to need a bungalow in a certain Southern California city, a city full of retired farmer-folk from farther East. Among the bungalows that the real estate agent showed me, was one belonging to an old farmer and his wife. It was a story-and-a-half bungalow, though the upper story was unfinished. Well, after looking through the cool, dainty bedrooms on the first floor, I said I'd like to look through the upper story. So we climbed the steep stairs and there, beneath the rough rafters and bare shingles, in the half darkness of the dingy attic, was a bed, recently slept in, and still unmade. The old lady apologized: 'I hadn't got 'round to it, yet, this morning, and I didn't expect anyone to come up here.'



An inexpensive bungalow for the farm



"He Always Slept Upstairs"

"'You must have a big family to fill those downstairs bedrooms and then have to use the attic,' I remarked.

"'Oh, no, just my husband and myself. But he says that he's always slept upstairs all his life and that he's too old to change now. So we don't use those first-floor bedrooms except when company comes.'

"Now, we may laugh at the old couple, sleeping upstairs in sordid discomfort, while those dainty, convenient downstairs bedrooms lay idle; but aren't we sometimes tied just as tightly by our own foolish fetters of custom? For instance, we start to plan our home, and purely as a matter of course, we mention the dining-room as one of the necessary features.

Do You Need a Dining-Room?

"Yet, hundreds of farm women—and town women, too—are asking themselves: 'Do we really need a dining-room after all? It costs a lot of money to build, a lot of money to furnish, and it surely means a lot of extra steps to the housewife! Isn't there some way of doing without the dining-room, and yet having orderly, well-served meals?'

"And hundreds of progressive women have answered these questions to their own complete satisfaction by cutting out the dining-room and putting in a neat, convenient little breakfast-nook. Nine-tenths of the meals for a small family can be served there, and served with less than half the labor that dining-room service would demand from the housewife. Of course, there should be a fairly large living-room, so that an occasional formal guest-meal may be served there is desired.

Plenty of Elbow Room

"So, here's a little farm bungalow, planned without any dining-room, but it has a breakfast nook, and a large living-room. The kitchen is fairly small—it is meant only for cooking and Mrs. Farmer will do her extra work on the large, breezy screened porch. An oil stove set out there, will do all the canning, preserving, etc., very satisfactorily, leaving the kitchen free and uncluttered. This screened porch has removable glass sash so it will serve as laundry, washroom and so on, regardless of the weather. It also serves as the family 'entry,' hubby and the children come in this way, and go right to the bathroom without tramping muddy-footed through any rooms."

Brush Versus Spray Methods of Painting

A COMPARATIVE test of interior painting for cement plaster was carried out last fall under the direction of Committee D-1 of the American Society for Testing Materials.

Three identical wall spaces of soiled and unpainted cement plaster in a large hall in Carnegie, Pa., were marked off, each having an area of 205 square feet. On space No. 1, two expert brush men coated the surface in 17¼ minutes. On space No. 2 one man with a spray gun coated the surface in 12½ minutes, and on space No. 3 one man with a spray gun covered the space in 12 minutes. Both of the areas showed considerably better hiding than the brushed space. The brush men worked at extreme speed.

On the ceiling work, two men, each using a spray gun, sprayed 3,400 square feet in 2 hours and 15 minutes.

Taking the ceiling and wall work together, 4,000 square feet were sprayed with 29 gallons of paint, one coat, giving much better hiding than the brush work.

The paint used in this test was very heavy flat wall finish in white. This test developed that it is possible on this class of work to get much better hiding with the spray than by brushing, for there is less rubbing up of the dust and dirt into the wet paint; moreover, more paint per coat can be applied with the spray than by hand brushing. The cost of painting the wall section, 205 feet in area, at a rate of $1.35 per hour was 77.6 cents with the brush and 27 cents with the best spray.

AEROPLANE VIEW OF CEDAR RAPIDS, IOWA

The plant of the Hawkeye Lumber and Coal Company is just out of the picture at the end of the bridge on the extreme left. Note the many street-wide bridges connecting the east and west sides of the city. The island in the Cedar River is the nucleus of a projected "city beautiful" improvement plan. The large plant and elevator belong to the Quaker Oats Company. Cedar Rapids boasts 1000 acres of landscaped residential districts, many of them marked by hilly, wooded terrain traversed by winding streets and drives. There are 300 acres of public parks and playgrounds and 98 miles of paved streets. The city has grown from a lone trading post in 1837 to a population of 47,000 by the 1920 census. It has 500 retail establishments and the value of its manufactured products in 1920 was nearly $100,000,000. The La Plant Choate Manufacturing Company, known to readers of NATIONAL BUILDER as a maker of house-moving equipment, is located here; likewise the Flexo-Concrete Mould Company; the Chandler Heater Company, maker of hot-water and steam boilers and hot-air furnaces; Joseph Barnett & Company, makers of copper-cable lightning rods and fixtures, and the Builders Material Company, maker of a device for carrying bricks. The city is reached by four steam railways and four interurban electric systems, and it is on the Lincoln and Pershing highways. Coe College, accommodating about 1200 students, is located in Cedar Rapids, and the city has three new half-million-dollar junior high schools. Cedar Rapids is one of the leading towns of the country in

Merchandising Houses

How the Hawkeye Lumber and Coal Co., of Cedar Rapids, Iowa, and Their Contractors, Builders and Architects Are Utilizing National Builder's New Architectural Service to Develop Business and to Sell More House Bills—What They Think of the Plans, Designs, Construction Details and Material Lists of the Houses Shown

By L. M. Francisco

"GIVE me a ticket to the best town in Iowa." This was the command issued by a smartly dressed young man at the head of the line before a ticket window in the Chicago & Northwestern depot in Chicago. Without saying a word, the ticket agent handed him a ticket to Cedar Rapids.

What looks like a prize-winning idea has come out of this "best town," and it is well worth passing on. This idea has already been adopted by half a hundred lumber dealers who are making use of it among more than 1000 contractors and builders, and probably by the time the story has been spread around, almost every live lumber dealer in the country and his contractor and builder customers will be benefitting from it.

The idea originated in the round-table conferences of the principals of the Hawkeye Lumber and Coal Company, whose yard is situated on the Cedar River near a dam, a location which gives rise to the company's slogan, "The Best Mill by a Dam Site in the City." A picture of these men, who are rated by their fellow townsmen as being among the livest wires in Cedar Rapids, appears on the next page.

D. S. Barry, vice-president of the company, who is in charge of the plan service department and who has most to do with the sale of house bills, explained what led him to propose the idea previously mentioned.

He said: "When I first read NATIONAL BUILDER'S announcement of the contract they had made with The Architects' Small House Service Bureau for plans, designs and construction details for three small houses to be published every month, it occurred to me that I might use the magazine as a means of digging up business and of establishing and maintaining contact with our contractors and architects. That is why we are going to figure our prices on the materials for these NATIONAL BUILDER houses every month and then get out a letter to every subscriber for the journal in Cedar Rapids, quoting our prices with the suggestion that they be used as a sales clincher in talking house building to prospective customers.

"When thinking about home building, people like to get down to brass tacks and to know what actual costs are. Giving our contractors and builders this price information will eliminate guess work and enable

PRIZE OFFER!

REFER to your January issue of National Builder, page 60, for the details of a prize offer of $525 in five separate prizes—$250, $125 and three at $50 each—for the best articles by subscribers on how you are using The Architects' Small House Service Bureau plans in your work.

Remember we are after hard-boiled facts; you don't have to be a writer; all you have to be is a live-wire builder, contractor or dealer. Are you merchandising houses through the use of these National Builder designs? If you are, how and with what success? Let's hear all the details.

Nathan C. Rockwood

Editor, National Builder.

Chicago, Ill., Feb. 23, 1923.

The office and plant of the Hawkeye Lumber and Coal Company. The slogan, "The best mill by a dam site in the city," is derived from the fact that the plant is situated near the dam in the Cedar River

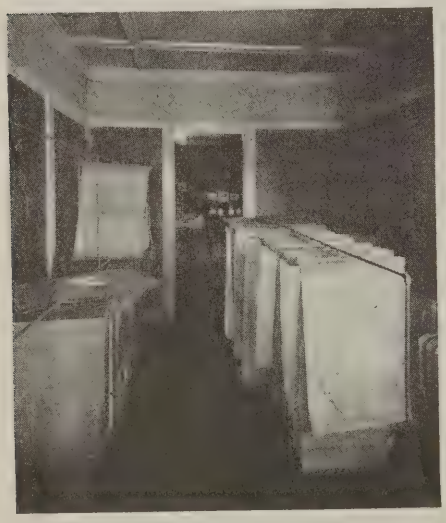
the home builder to think about building in definite terms.

"A monthly letter containing our prices on three practical homes is the best follow-up system that we can think of for keeping in touch with our trade. NATIONAL BUILDER going to each contractor, builder and architect every month will be a constant reminder of our service and through our quotations on the houses it contains, we are making a definite tie-up between the publication and ourselves.

"We want to make this tie-up because we believe in the work that NATIONAL BUILDER is doing. We believe that houses should be built only from thoroughly worked out and carefully drawn plans and construction details. Publishing complete working plans by a builders' journal is educational work such as we have never before seen. It will have a far-reaching influence on the building habits of contractors and builders everywhere. It will make them want to build from better plans by showing them how much easier it is than to build from roughly and hastily drawn sketches. The publication of these complete plans will not beat architects out of any business. By familiarizing their prospective clients with better plans, it is going to make more business for them.

"We may not have many houses built in Cedar Rapids 'as is' from NATIONAL BUILDER'S plans but we do expect to sell some house bills that have been inspired by them and which will have been planned and designed by architects who can measure up to the same standard of work."

The motive force back of the Hawkeye Lumber and Coal Company. Reading from left to right: O. T. Barry, president and general manager of the company; D. S. Barry, vice-president, in charge of the plan service and coal department; H. T. Barry, secretary-treasurer, in charge of accounting, collections and financing; C. E. Carpenter, office manager, in charge of estimating and billing, and J. A. Harrier, yard manager. Three of these men have degrees in mechanical engineering from Ames, while a fourth is a graduate in law and a Phi Beta Kappa from the University of Iowa. Mrs. John W. Barry, whose husband founded the business in 1900, and who is actively interested in its management as a vice-president of the company, was unfortunately unable to be in this picture with her three sons and their associates



D. S. Barry borrowed an idea for filing his plans from a garment rack in a clothing store. The contents of this plan room are witness to his belief in the value of the actual blueprints in selling homes and other buildings

Mr. Barry pointed out some of the houses for which his company had furnished materials and which were designed by Cedar Rapids architects and built by Cedar Rapids contractors and builders. They certainly

Prospective home owners and other customers have access to all sorts of information about houses and other buildings and about all kinds of building materials, accessories and equipment, in this spacious room on the second floor of the office

Home of Harold Cooper, in Cedar Rapids, Iowa. Built by Charles Harris, contractor and builder, from Plan No. 551, slightly revised, of The Architects' Small House Service Bureau, Inc.

were of better design than the houses one sees in many cities of 50,000 population. They make one believe that perhaps Cedar Rapids deserves the title of "the best town in Iowa" simply because of the good taste that these houses show. Photographs were taken of half a dozen of them and four are shown in the "Style Sheet" with this issue on pages 38 and 39, and their plans appear on page 41.

The pictures of the other two houses are a part of this article. They were built from plans furnished by The Architects' Small House Service Bureau out of the book, "How to Plan, Finance and Build Your Home." They were not built exactly according to the "stock" plans but very closely follow them. What changes were desired were made by the bureau and by local architects. The service of the bureau proved eminently satisfactory in every respect, according to Mr. Barry.

"I know of no architectural service in existence," he said, "that is the equal of that offered by The Architects' Small House Service Bureau. Their plans are so thoroughly worked out and so accurately and carefully drawn and they give the builder so much information to work from that I hardly see how they could be improved. We were very much pleased to find that NATIONAL BUILDER is publishing the same kind of plans, but different houses, as are furnished by the bureau in their regular service and that they are being published in their entirety."

Charles Harris, superintendent of construction for a large realty concern in Cedar Rapids, and the builder of Harold Cooper's little home, which was constructed from plans by The Architects' Small House Service Bureau, thinks the Hawkeye Lumber and Coal Company's scheme is a fine one for the contractor and builder.

"But are you not afraid," he was asked, "that when every contractor and builder has the same prices from the Hawkeye Lumber and Coal Company, it will lead to price cutting among them, resulting in demoralization and preventing anyone from making a profit?"

"Of course not," he replied. "It ought to work the other way around. If all contractors and builders have the same quotations on the materials for the houses, their chances of making errors in their bids and of cutting their prices are just that much less. It will come nearer to putting us all on an equal basis than anything I know of, allowing the best man to get the business."

"I can ask for nothing better," he continued, "than to build a house from The Architects' Small House Service Bureau plans. I can make more money when I have these plans to go by because they eliminate guess work. The houses almost build themselves with a minimum of supervision from me because complete instructions are given the workmen in the blue prints themselves."

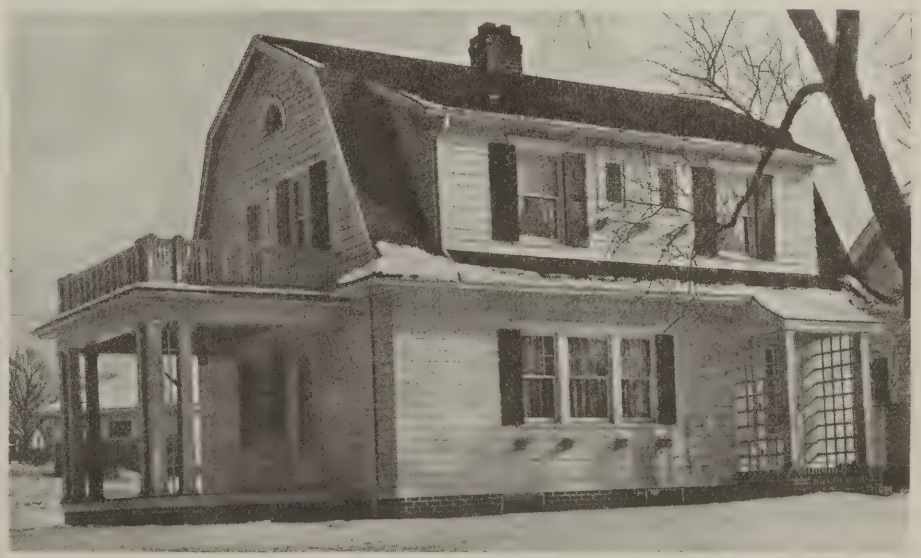
Bruce McKay, of the McKay Construction Company, architects and builders, corroborated Mr. Harris' opinion and also confirmed what Mr. Barry had said about the need for plans for houses of better design.

"It is a matter of education," he said. "The customer has to be educated and when the architect and builder is supplied with good plans of houses that have some architectural merit, he is given a very powerful instrument for advocating the building of better homes."

Anthony-Holmes is a firm of architects and engineers in Cedar Rapids who are also very much interested in the architectural service that NATIONAL BUILDER is publishing and in the Hawkeye Lumber and Coal Company's scheme for making that service effective. Mr. Anthony, of this firm, is a graduate of the School of Architecture of the University of Illinois and received a great deal of practical experience in a well-known architectural office in Chicago.

"'What will it cost?' is about the first thing that most people who come to see me about building ask when they see a picture and plans for a house that they like," was Mr. Anthony's comment. "The Hawkeye Lumber and Coal Company cannot supply us with any too much price information, so far as we are concerned. We will appreciate having their figures on the houses to be published in NATIONAL BUILDER."

The details of working out the scheme of the Hawkeye Lumber and Coal Company are very simple. NATIONAL BUILDER sends them, about two weeks before the publication of each issue, advance proofs of the material lists for each of the three houses



Home of E. J. Nichols, in Cedar Rapids, Iowa. Built by Ed Monilaw, contractor and builder, from Plan No. 569, slightly revised, of The Architects' Small House Service Bureau, Inc.

that are to be shown in that issue. The company immediately figures their prices on the materials for these homes. They then write a letter to every subscriber for NATIONAL BUILDER in their town, quoting their prices on these homes. The following is what Mr. Barry wrote to his contractors and builders when mailing out his company's prices on the first three houses shown in the January issue:

HAWKEYE LUMBER AND COAL CO.
Cedar Rapids, Iowa

January 13, 1922.

Twelve copies of the National Builder will come to your during 1923—through our efforts at playing Santa Claus.

Twelve copies; and in each, three absolutely new, complete home designs. Thirty-six fine, attractive, workable plans by the foremost architects co-operating through The Architects' Small House Service Bureau, controlled by the American Institute of Architects.

These plans are so good that your friends who desire to build will wish to use some one of them almost on sight. And then the question is: "What will it cost?"

A ready answer may close a quick sale. And the answer, the Hawkeye is prepared to give immediately—in fact will give you by mail each month a quotation upon all the lumber, millwork and lath required for each of the three homes shown.

Blue prints for each will be at our office for these as well as the balance of the Hawkeye Plan Service Homes. Fifty built in 1922!

Prices of the Designs in the January National Builder—Millwork, Lumber and Lath

House No.	Our Price
4A26	$2,272.00
5A50	1,925.00
6A45	2,380.00

Hawkeye Lumber and Coal Company

A letter like this, with price quotations, is mailed so as to reach each subscriber simultaneously with his monthly copy of NATIONAL BUILDER. It enables him to think more concretely in relation to the plans and designs shown in NATIONAL BUILDER, and he has price information that makes each issue useful to him in going after business the minute he receives it.

When Mr. Barry informed NATIONAL BUILDER that he was putting price information into the hands of his contractors and builders subscribing to this publication, a letter was sent to all lumber dealers in towns where there were ten or more subscribers, asking them if they would like to do the same thing and have advance proofs of the material lists for the houses to be published in each issue.

Over 25 per cent of them replied within the first week after the mailing of this letter, stating that they would indeed appreciate this co-operation and would like to have the material lists in advance. Arrangements have been made to supply these material lists for this purpose, and any other dealer who would like to take advantage of this idea or any contractor or builder who would like to have his dealer supply him with prices is very welcome to this service. There is no charge for it. Simply write NATIONAL BUILDER, Material Lists Department, 542 South Dearborn Street, Chicago, Ill.

Suggestions for Making Partitions Soundproof

A STUDY of the problems of making partitions soundproof has been made by the engineering experiment station at the University of Illinois, Urbana, Ill. Because certain principles of sound transmission are overlooked, partitions that would ordinarily be an effective barrier to sound occasionally fail to function as expected, and some of the possible reasons are pointed out in a bulletin (No. 127), reviewing the study of the subject at the experiment station. Sound may be transmitted from one side of a partition to the other in three ways, it is stated in the bulletin. It may progress through continuous air passages, it may pass as an elastic wave through the solid structure of the partition, or by setting the partition in vibration it may originate sound waves on the further side.

"These actions are quite readily understood," according to the bulletin, "by remembering that sound consists of a series of compressions and rarefactions that progress rapidly through a medium without interruption unless they meet new medium with a different elasticity or density. For instance, sound waves in air proceed without hindrance through air passages, such as ventilation openings in a partition. If, however, the passages are small in cross-section, as in the case of a porous material, the progress is hindered and a certain amount of absorption of the energy takes place, due to the friction set up between the vibrating air column and the sides of the pores.

"In case the partition is impervious to air, the direct progress of the waves is interrupted. A third partition is set in vibration, and thus originates new waves on the side opposite the incident sound. For a thicker, more rigid partition, the vibrations are smaller, and a very considerable part of the energy is reflected. The transmission in this case takes place by compressional waves communicated to the solid material of the partition. The amount of energy thus transmitted is usually quite small.

"In view of these considerations, a soundproof partition should be as rigid and free from air passages as possible. For effective sound-proofing of a group of rooms, the partitions, floors, and ceilings between adjacent rooms should be made continuous and rigid. Any necessary openings for pipes, ventilators, doors, and windows should be placed in outside or corridor walls, where a leakage of sound will be less objectionable.

"In case the sound is generated in the building structure, as the vibrations set up by a motor fastened to the floor, the compressional waves proceed through the continuity of solid materials. In order to stop them, it is necessary to make a break in the structure so as to interpose a new medium differing in elasticity and density. For instance, the vibrations of a motor may be minimized by placing a layer of hairfelt, or similar air-filled material, between the supporting base and the floor. Where the machine is quite heavy, footings may be made of alternate layer of asbestos, lead and leather. Bolting through this material will reduce the insulation, because the vibrations in this case will pass easily through the bolts to the floor. The insulation should thus be left without any bridging over of the discontinuities. Air gaps in masonry will be effective if the air space is not bridged over at any point. A floor floated on sand, sawdust, or hairfelt would approximate this condition. The edges of the floor should be insulated from the walls by felt or similar material.

Rehearing of Metal Trim Award

ON Monday, January 8, 1923, the National Board of Jurisdictional Awards, at an all-day session in the La Salle Hotel, Chicago, decided to order a rehearing of the metal trim decision which has been in controversy for some time.

The submission of evidence and claims for the jurisdiction over various sorts of metal trim installation will be held in Washington, D. C., on February 19, 1923. The rehearing was asked for some time ago by contractors of national reputation in the construction field and was requested also by heads of the American Federation of Labor. Carpenters', sheet metal workers' and iron workers' unions are expected to submit evidence in support of their claims to the right to install metal trim.

That a progressive step has been taken by the board of awards is generally conceded. It is now up to the carpenters' union to show whether they are capable of appreciating the position which they brought upon themselves by a summary withdrawal from the board and from the Building Trades Department of the A. F. of L. If the carpenters still fail to understand that a board of awards must act in the nature of court of equity and review and if they continue to resort to strike methods to enforce a demand rather than to the presentation of evidence of a technical and customary nature then the only answer that the construction industry can make to them must be one of drastic action.

Many contractors are in sympathy with the carpenters' claims to the setting of metal trim, says the *American Contractor*. No contractor can be in sympathy with the methods adopted to enforce them.

National Builder Style Sheet

House No. 1—H. Leland Magill, architect. *See description, page 13*

House No. 3—See elevations and plans, page 16

House No. 6—H. Leland Magill, architect. *See pages 13 to 18*

House No. 7—H. Leland Magill, architect. *See pages 13 to 18*

House No. 9—See elevations and plans, page 17. H. Leland Magill, architect and builder

House No. 11—H. Leland Magill, architect and builder. See pages 13 to 18

House No. 14—H. Leland Magill, architect and builder. *See pages 13 to 18*

House No. 15—H. Leland Magill, architect and builder. *See pages 13 to 18*

Five-room English type bungalow. O. McCracken, architect. Built by the Suburban Investment Company, Hutchinson, Kans. *See plan on page 41*

House at Glencoe, Ill., a suburb of Chicago, showing English influence

Home of W. L. Shankland, Cedar Rapids, Iowa. Designed and built by McKay Brothers Construction Company. See plans on page 41. The design shows good balance and the entrance is attractively treated

Another home designed and built by McKay Brothers Constr uction Company, in Cedar Rapids, Iowa; H. Kadgihn, owner. The small panes of glass in the two large groups of win dows are a decorative feature. See plans on page 41

A stone house designed and built for Edward F. Edinger, Cedar Rapids, Iowa, by McKay Brothers Construction Company. Plans are on page 42. The roof is of asbestos "colorblende" shingles which are becoming to the stone gray walls of the house

Home of C. W. Timberlake, Cedar Rapids, Iowa. Holmes-Anthony, architects; Iowa Construction Company, builders. Plans on page 42. The soldier courses in the brick foundation and the chimney treatment are good. The roof is of vari-colored wood shingles and the blinds are blue against wide siding painted white

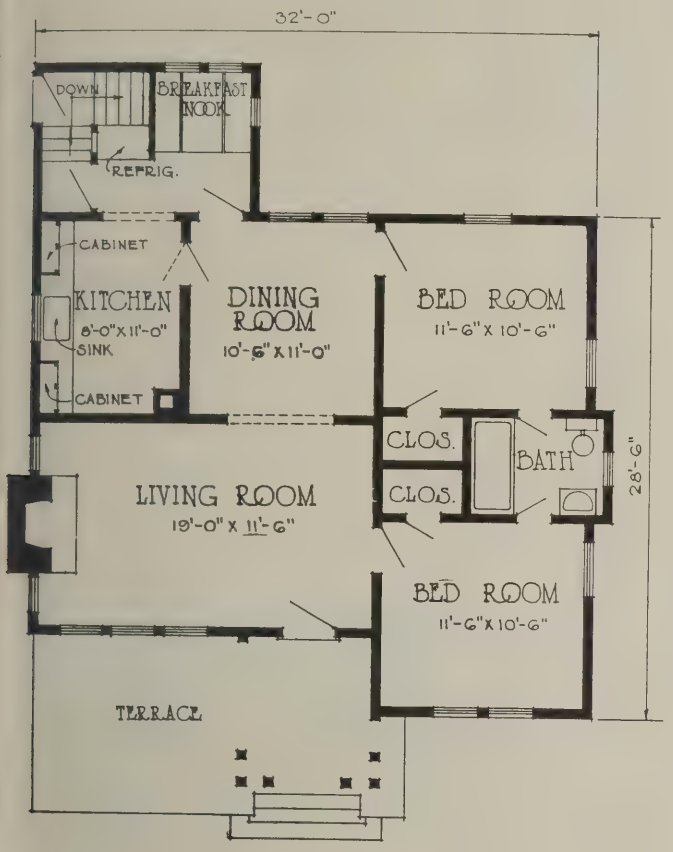
House at Cleveland, Ohio. Karl I. Best & Co., architects. Fairfax Construction Co., builders. See plans, pages 42-43

House at River Forest, Ill., a suburb of Chicago. See detail of entrance on page 43

Floor Plans of Style Sheet Houses

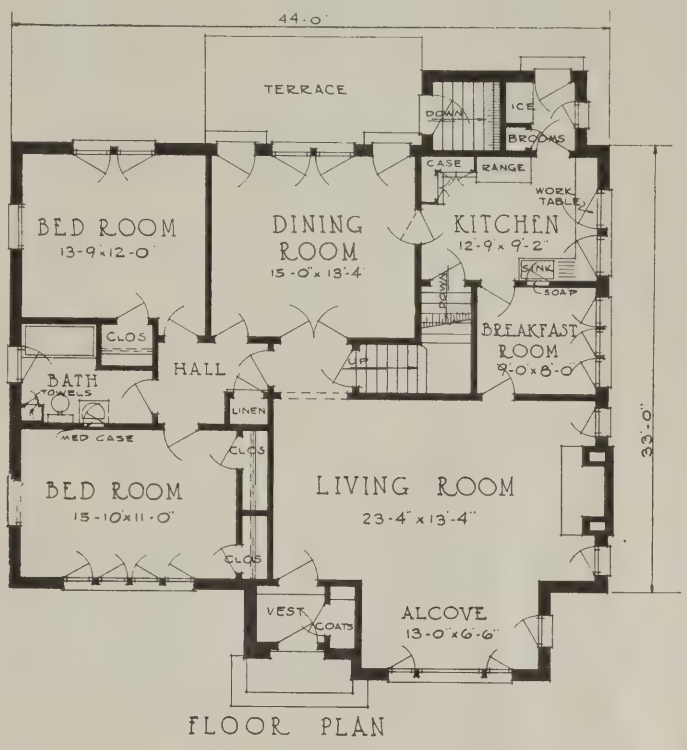
Five-Room English Type Bungalow

This bungalow is built on a 50-ft. lot, at 124 East 16th street, Hutchinson, Kan., by the Suburban Investment Company. There are five rooms with fireplace, and oak floors have been used throughout, with just enough built-in work on the interior to make for convenience without giving it the appearance of an apartment. It was placed on the market November 22 at $5250. See large photograph reproduction on page 37 of Style Sheet.



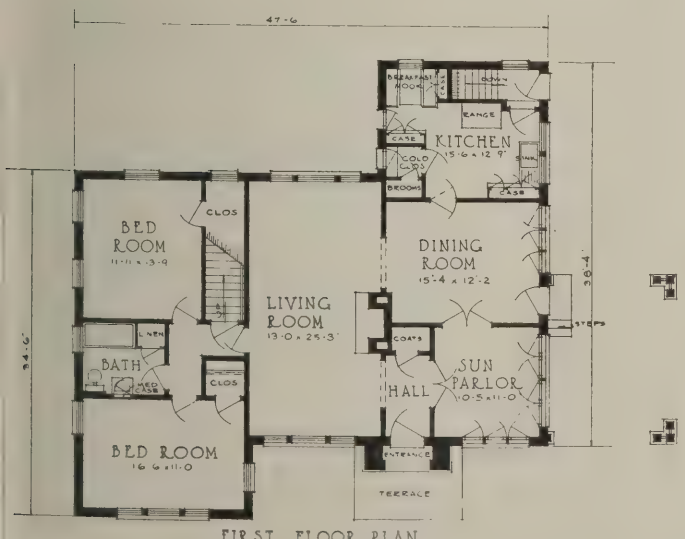
FLOOR PLAN.

Five-room English type bungalow. See Style Sheet, page 37

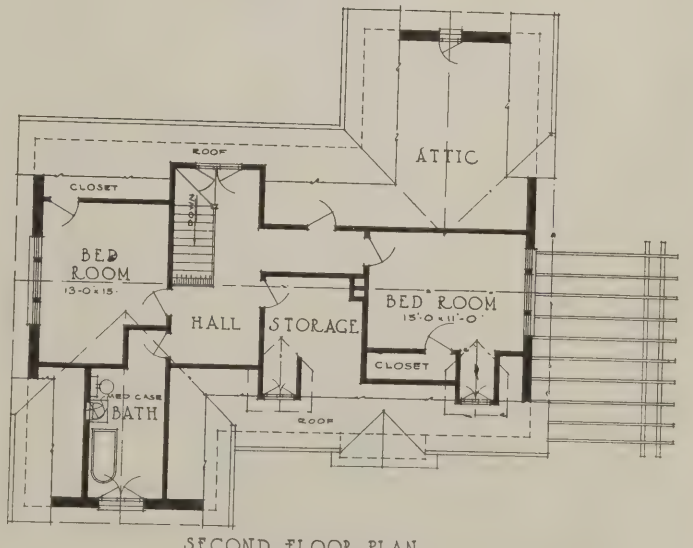


FLOOR PLAN

Floor plan of residence of H. Kadgihn, Cedar Rapids, Iowa. See photo elevation on page 38 of Style Sheet

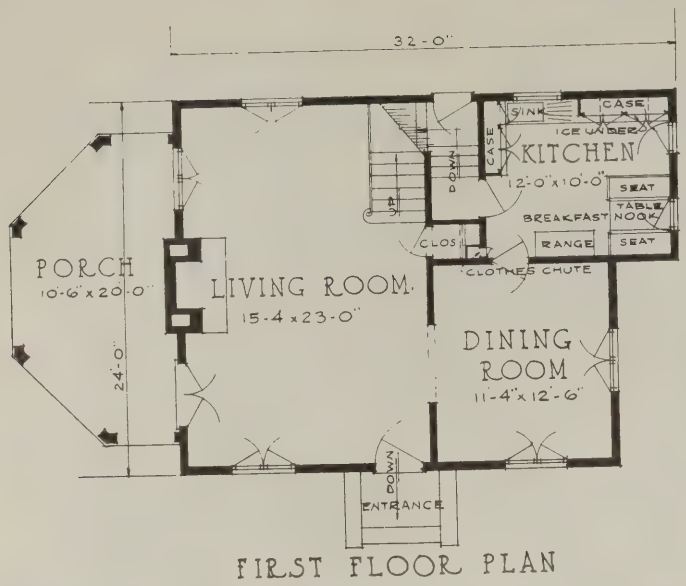


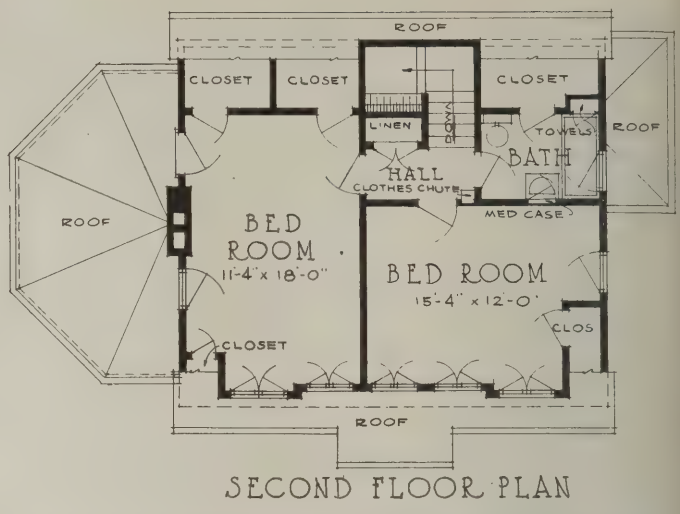
FIRST FLOOR PLAN



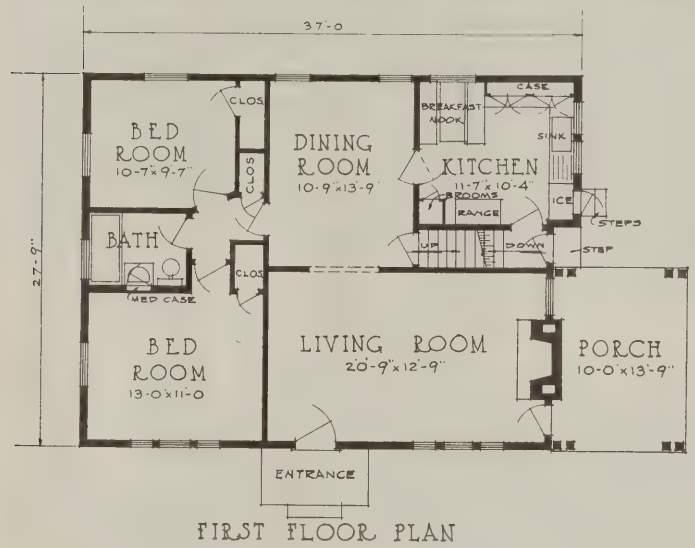
SECOND FLOOR PLAN

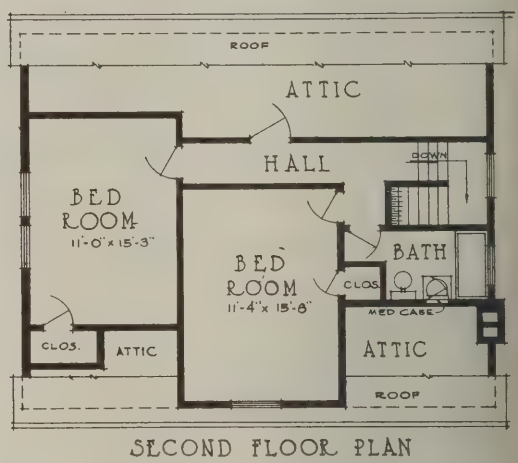
Floor plans of residence of W. L. Shankland, Cedar Rapids, Iowa. See photo elevation on page 38 of Style Sheet



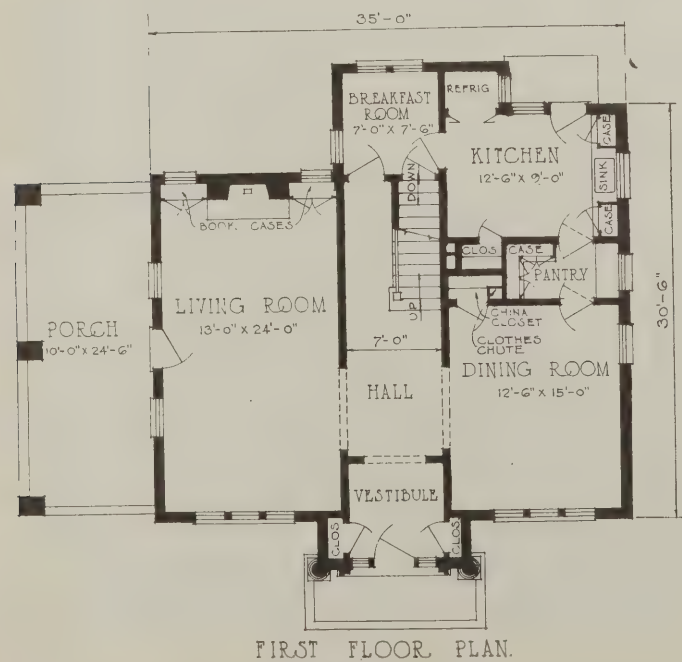


Floor plans of residence of Edward F. Edinger, Cedar Rapids, Iowa See photographic elevation on page 39 of Style Sheet





Floor plans of home of C. W. Timberlake, Cedar Rapids, Iowa. See photographic elevation on page 39 of Style Sheet



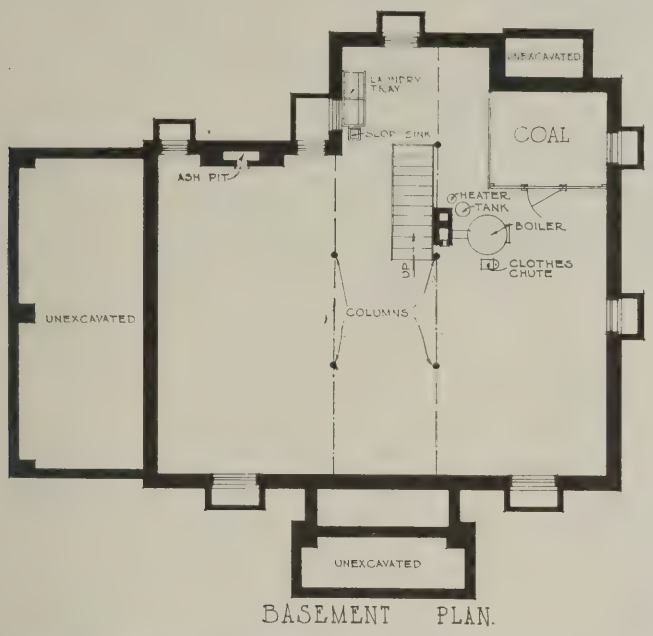
Floor plans of house, Cleveland, Ohio. Karl I. Best & Co., architects. Fairfax Construction Co., builder. See photo elevation on page 40 of Style Sheet

Fairfax Construction Co. House at Cleveland

The house shown on page 40 of the Style Sheet is one of many built in the Shaker Heights section of Cleveland, Ohio, by the Fairfax Construction Co. of that city. The operations of this building company were described in the December issue of NATIONAL BUILDER.

The article in the December issue contained some comments on the development of the Shaker Heights section as a whole which it seems were taken by some to be directed at the houses erected by the Fairfax Construction Co. This was not the intention. In fact, the houses built by this company are rather an exception to the general run of speculative builders' houses in Cleveland or elsewhere. The house illustrated in this issue is still another example of the effort made by this company to place on the market houses designed by competent architects and planned to meet the demands of the most discriminating purchaser.

This plan has all the features of the most up-to-date city home in a city where competition in home building is very keen. Particular attention is called to the breakfast room and its convenient location. The bedroom layout is also out of the ordinary and is so arranged as to provide a maximum amount of cross ventilation.



BASEMENT PLAN.

Basement plan of house by Fairfax Construction Co., Cleveland, Ohio. See photo elevation on page 40 of Style Sheet

Detail of entrance, house at River Forest, Ill. See page 40 of Style Sheet

How to Build Business

"THE right way to get business is to get out after it," says L. A. Haley, of Milltown, Maine, on the Canadian border, according to *Domestic Engineering*. "I get business on both sides of the border by going after it. I get business in the winter and I get it in the summer. How? By keeping awake. Instead of just jobbing through the winter, I get a line on the prospects for the start in the spring.

"I get a line on the people who intend to build new houses in Milltown and vicinity. I get a line on those who have already built houses but are without heating systems. Maybe some houses have no sanitary plumbing. Maybe they are without up-to-date bathtubs.

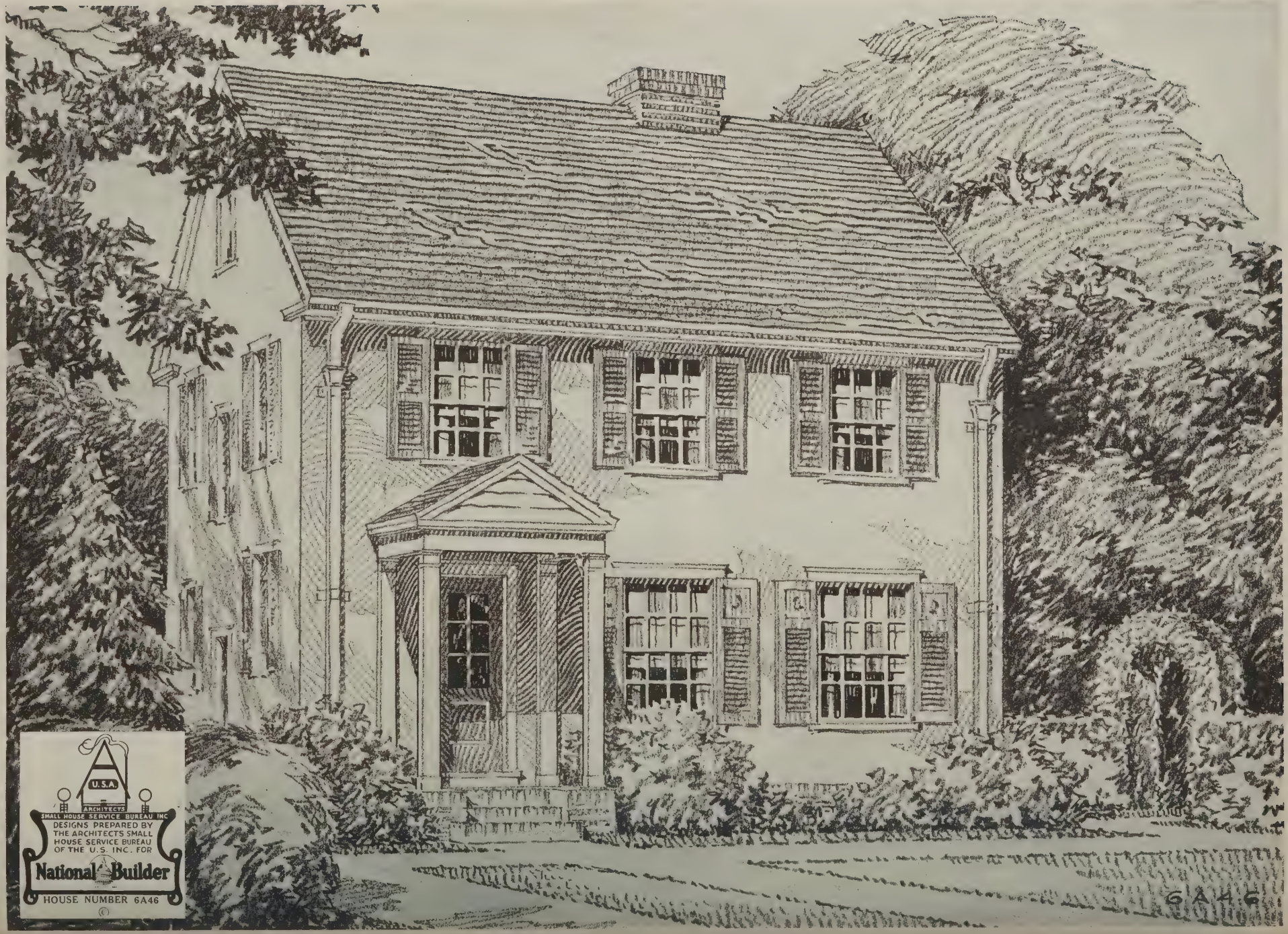
"During the winter I canvass all these people personally at first. I divide them into classes. I have three classes: Likely, Unlikely and Doubtful. With those in the 'Likely' class I keep on the job with personal canvass mainly, until I get the contract.

"With the Unlikely class I do not overexert myself. There are some people in my community who would not give me an order if there was no other member of the trade in the community. It's like that in every community—especially the small towns.

"I canvass the 'Doubtful' class personally and send them advertising matter. I don't use mimeographed letters. There is too much sameness about them. I want something individual. I want the people to think I take enough interest in them to write them a personal letter and not make the same wording do for a couple of hundred people. I usually get at least 50 per cent of these on my 'Doubtful' list. But I assure you I don't get them by standing still or just doing jobbing work during the winter months. You have to get busy if you want to keep busy."

Sylvester's Process of Damp Proofing

THE method of damp proofing known as the Sylvester process consists of the application of yellow soap, alum and water, says "Colon" in the *Illustrated Carpenter and Builder* (England). Make two mixtures—one consisting of 3 lb. of shredded yellow soap in four gallons of water, and the other of ½ lb. of alum in four gallons of water—both substances to be perfectly dissolved before being used. The wall must be quite clean and dry, and the temperature of the air should not be below 50 deg. F. when the washes are applied. Fine, mild, and dry weather is essential. The first, or soap, wash should be laid on when at boiling heat with a whitewash brush, taking care not to form a froth on the brickwork. This wash should remain on for 24 hours, so as to become dry and hard before the second, or alum, wash is applied, which should be done in the same way as the first. The temperature of this wash may be 60 or 70 deg. F., and it should also remain for 24 hours before a second coat of the soap wash is put on, and these coats must be repeated alternately until the desired effect is produced. Probably two coats would suffice. In these solutions the alum and soap combine to form an insoluble compound which fills the pores of the bricks and entirely prevents the rain water from penetrating the wall. On a 9-in. wall the builder should be sure that the through joints are watertight and not open from shrinkage of the mortar, otherwise any wash would be useless for the purpose intended.



A Six-Room Dutch Colonial House

A Six-Room Dutch Colonial House

House No. 6A46 Designed for National Builder by the Regional Service Bureaus of The Architects' Small House Service Bureau of the United States. This House Prepared by the Northwestern Division Regional Bureau

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THERE is a place in every community for a home of this type. It has a simple dignified exterior of Dutch Colonial style. It should be built for moderate cost, having a most practical and convenient arrangement of rooms.

The house is of frame construction with stucco exterior and shingle room. A desirable feature is the open porch 14′ 6″x9′ with a cement floor bordered with brick.

The floor plans have been developed to utilize every inch of floor space so as to provide six comfortable, well proportioned rooms with plenty of wall space for large furniture.

Few houses of this size contain so generous a living room, or one so attractive in arrangement. The inside fireplace is placed where it will be the center of interest in the furnishing and decorative scheme. The plaster opening between the dining room and living room is provided with built-in bookcases at either side.

To make housework as easy as possible the kitchen has been planned to include built-in cupboards. There is a broom closet in the entry. A convenient feature, which will doubtless be appreciated by the mistress of the house, is the dining alcove in the kitchen, where breakfast and lunches may be quickly served.

The second floor contains three good size bedrooms and a sewing room. A large linen closet and clothes chute are provided in the sewing room The bathroom has a recessed tub and a towel closet.

There is generous closet space. Each bedroom has a closet and there is a convenient coat closet in the vestibule. In addition there is a commodious attic reached by a stairway from one of the bedrooms, and additional storage space in the basement.

The grade entrance to basement and kitchen is another convenient feature. The basement contains a heater room, storage room and well lighted laundry.

This home can be built in a 40 ft. lot. As it stands it can face west or south and can be reversed for other facings. The reversed plans are provided without extra charge. The regular price of this plan is $30. Half price to NATIONAL BUILDER subscribers.

Specifications and Quantity Survey

EXCAVATING: 240 cu. yds.

BACK FILLING: 35 cu. yds.

FOUNDATIONS:

If 12″ concrete, 46 cu. yd. gravel, 186 sax cement
If 9″ concrete, 37 cu. yd. gravel, 150 sax cement
If 12″ tile, 22 M, CBM tile, 16 cu. yds. mortar
If 9″ tile, 17300 CBM tile, 13 cu. yds. mortar

FACE BRICK:

1400 face brick
1 cu. yd. mortar
60 lb. mortar color

CEMENT FLOOR:

6 cu. yds. gravel
5 cu. yds. sand
66 sax cement
4 cement spatter blocks

CHIMNEY:

3000 common brick
225 face brick
72 lin. ft. 8x12 flue tile
3 cu. yds. mortar
6 sq. yds. metal lath
2—8x10 clean out
3—6″ adjustable thimbles
16 sq. ft. hearth tile
130 fire brick
25 lb. fire clay
1 cast iron ash dump
1 throat and damper
1—4x3x5/16 angle
200 inside face brick

LATH: 11M lath

INTERIOR PLASTER:

760 sq. yds. wall and ceiling
14 sq. yds. Keene's cement

STUCCO: 270 sq. yds. stucco on metal lath

TILE FLOORS:

42 sq. ft. ceramic tile
23 lin. ft. cove base

LUMBER:

4—6x 6- 7 posts
3—2x10-12 girders
3—2x10- 8 girders
2—2x 4-12 girders
2—2x 4- 8 girders
40 lin. ft. 2x4 basement partition plates
14—2x4-7 basement partition studs
200 ft. 6″ D&M basement partition sheating
4—2x 4-14 stair stringers
48—2x10-14 first floor joist
4—2x10-14 first floor joist doubles
240 lin. ft. 1x 3 bridging
60 lin. ft. 2x10 box sill
770 ft. com. bds. 1st floor subfloor
890 ft. 13/16x1½ first floor finish floor
60 lin. ft. 1x3 ribbon
336 lin. ft. 2x4 outside wall prates
92—2x4-18 outside wall studs
10—2x4-16 opening headers
20—2x4-14 opening doubles
30—2x4-10 gable studs
276 lin. ft. 2x4 1st fl. part. plates
80—2x 4- 9 first floor partition studs
4—2x 4-18 first floor stair horses
48—2x10-14 second floor joist
770 ft. com. bds. second floor subfloor
860 ft. 13/16x1½ second floor finish floor
4—2x10-14 headers and doubles
348 lin. ft. 2x4 second floor partition plates
102—2x4- 8 second floor partition studs
4—2x4-16 attic stair horses
10—2x4-16 headers
10—2x4-14 opening doubles
4—2x8- 9 porch girders
2—2x8-14 porch girders
12—2x4- 9 porch ceiling joist
48—2x8-14 attic floor joist
4—2x8-14 attic floor joist headers
830 ft. 6″ D&M attic floor
24—2x4-6 collar ties
30 lin. ft. 1x8 ridge rafter
48—2x4-6 rafter braces
120 lin. ft. 2x4 rafter braces plates
48—2x4-18 rafters
12—2x4-10 porch rafters
4—2x4-12 porch gable studs
6—2x4-16 headers
25—2x4-12 look outs
300 ft. bds. grounds
1430 ft. com. bds. roof sheating
11¾M shingles
70 ft. siding
2720 ft. shiplap OS wall sheating
200 ft. 5⅝x4 ceiling for porch
25—2x 4-16 scaffold
16—2x 4-14 scaffold
8—2x10-16 scaffold
4—2x 8-16 scaffold
5—2x 4-10 entrance rafters
4—2x 4- 7 ceiling joist

MILLWORK—Frames:

3 single frames 8x10-3L-1⅜
1 mul. frame 8x10-3L-1⅜
3 single frames 10x14-12L-1⅜
2 mul. frames 10x14-12L-1⅜
1 mul. frame 10x8-8L-1⅜
11 single frames 8x12-12L-1⅜
2 single frames 8x12-12L-1⅜ round heads

Windows:

5 sash 8x10- 3L-1⅜
7 wds. 10x14-12L-1⅜
2 wds. 10x 8- 8L-1⅜
11 wds. 8x12-12L-1⅜
2 wds. 8x12-12L-1⅜ round head

Storm Sash:

5 st. sh. 8x10- 3L-1⅜ vented
7 st. sh. 10x14-12L-1⅜ vented
2 st. sh. 10x 8- 8L-1⅜ vented
11 st. sh. 8x12-12L-1⅜ vented
2 st. sh. 8x12-12L-1⅜ vented round hd.

Screens:

5 screens 8x10- 3L-1⅜ Black wire, 14 mesh
7 screens 10x14-12L-1⅜ Black wire 14 mesh
2 screens 10x 8- 8L-1⅜ Black wire 14 mesh
11 screens 8x12-12L-1⅜ Black wire 14 mesh
2 screens 8x12-12L-1⅜ Black wire 14 mesh

Shutters:

11 pr. shutters for windows 8x12-12L-1⅜
2 pr. shutters for windows 10x 8-8L-1⅜

Outside Door Frames:

1 dr. fr. 3′0x7′-0 1¾
1 dr. fr. 2′6x6′8 1¾
1 dr. fr. 3′0x7′0 1¾

Outside Doors:

1 door 3′0x7′0—1¾
1 door 2′6x6′8—1¾
1 door 3′0x7′0—1¾

No. 1605

Storm Doors:

2 st. dr. 3′0x7′0—1⅜
1 st. dr. 2′6x6′8—1⅜

Screen Doors:

2 screen dr. 3′0x7′0
1 screen dr. 2′6x6′8

Exterior Millwork:

208 lin. ft. cornice

24 lin. ft. porch soffit and frieze
1 special triple window trim
8 porch posts
4 lattice panels 1'6x7'0

Interior Doors:

1 door 2'6x6'8—1⅜—5 XP
1 door 3'0x7'0—1¾—No. 1605
1 door 2'4x7'0—1⅜—No. 1102
1 door 2'6x6'8—1⅜
1 door 2'0x6'8—1⅜—No. 1102
1 door 2'6x7'0—1⅜—No. 1102
5 door 2'6x6'8—1⅜—No. 1102
4 door 2'4x6'8—1⅜—No. 1102

Jambs:

1 jamb 2'6x6'8
1 jamb 3'0x7'0
1 jamb 2'4x7'0
1 jamb 2'6x6'8
1 jamb 2'0x6'8
1 jamb 2'6x7'0
5 jamb 2'6x6'8
4 jamb 2'4x6'8

Interior Trim:

3 single side trim 8x10-3L
1 mul. side trim 8x10-3L
3 single side trim 10x14-12L
2 mul. side trim 10x14-12L
11 single side trim 8x12-12L
2 single side trim 8x12-12L round head
1 mul. side trim 10x8-8L
1 side door trim 3'0x7'0
1 side door trim 2'6x6'8
1 side door trim 3'0x7'0
2 side door trim 2'6x6'8
2 side door trim 3'0x7'0
2 side door trim 2'4x7'0
2 side door trim 2'6x6'8
2 side door trim 2'0x6'8
2 side door trim 2'6x7'0
10 side door trim 2'6x6'8
8 side door trim 2'4x6'8

Miscellaneous Millwork:

1 set basement stair with rail
1 set main stairs with rail
1 set attic stairs with rail
1 medicine cabinet No. 2835
1 double faced towel cabinet
1 7'6 linen cabinet
1 utility door, jamb and trim
2 book cases
1 mantle shelf
1 3'0 kitchen cupboard
2 3'0 kitchen cupboards
2 clothes chute door jambs and trim
2 breakfast room seats
1 breakfast room table
1 3'6 kitchen cabinet
1 icing door jamb and trim
1 meter cabinet
1 3'6 coat cabinet
1 wide window stool for triple
16 lin. ft. closet shelving
16 lin. ft. closet hook strip
16 lin. ft. closet clothes rod
74 lin. ft. chair rail
600 lin. ft. base
600 lin. ft. base moulding
600 lin. ft. base shoe
316 lin. ft. picture moulding
160 lin. ft. ceiling cove
10 lin. ft. threshold
2 drain boards
1 astragal

HARDWARE:

5 cellar sash sets
22 sash locks
22 sash lifts
27 storm sash sets
27 screen sets
13 sets shutter hardware
3 outside door sets with butts
3 storm door sets
3 screen door sets
1 floor hinge
14 inside locks with butts
6 stair brackets
1 pr. ornamental butts, 1 cupboard turn } medicine cabinet
3 pr. ornamental butts, 3 cupboard turns } towel cabinets
4 friction stays—utility door
4 blind catches
10 pr. ornamental butts, 6 cupboard turns } sewing cabinet
2 pr. ornamental butts, 2 cupboard turns } book cases
6 pr. ornamental butts, 3 cupboard turns, 3 blind catches } kitchen cabinet
1 set castors, 1 bin pull, 6 drawer pulls, 10 pr. ornamental butts, 5 blind catches, 5 cupboard turns } kitchen cabinet
2 pr. spring hinges for clothes chute
2 pr. ornamental butts, 1 cupboard turn, 1 elbow catch } cupboards over ice box
1 set icing door hardware
1 pr. ornamental butts, 1 cupboard turn } meter cabinet
1 inside double door set with butts
4 dozen clothes hooks
16 door bumpers
1100 lbs. assorted nails
10 lbs. assorted brads
1 coal chute
560 lbs. sash weights
5 hanks sash cord
2 dozen sheets sandpaper
1 gross shelf holders

REINFORCING STEEL:

24 ⅜ round rods, 9'0
16 ⅜ round rods, 4'0

TINWORK

30 lin. ft. ridge roll
2 finials
42 lin. ft. flashing tin
6 sheets sheet tin
75 lin. ft. gutter
6 gutter ends
5 nipples
5 offsets
5 elbows
5 shut offs
5 screens
20 gutter hangers
86 lin. ft. conductor pipe
14 conductor straps
200 tin shingles

INSULATION:

1800 ft. for outside walls
700 ft. for second floor ceiling
4 rolls water proof paper for walls
3 rolls red rosin for floors
3 rolls tar felt for roof

WEATHER STRIPPING:

5 cellar sash 8x10-3L
7 wds. 10x14-12L
2 wds. 10x8-8L
11 wds. 8x12-12L
2 wds. 8x12-12L
2 doors 3'0x7'0
1 door 2'6x6'8

CAULKING:

27 window openings
3 door openings
1 coal chute

EXTERIOR PAINTING:

31 gal. shingle stain
4½ gal. trim paint
2 gal. oil
1 gal. turpentine
1 qt. orange shellac
½ gal. cement paint
½ gal. sash color
½ gal. screen paint
¼ gal. shutter green
5 lbs. putty

INTERIOR PAINTING:

14 gal. white paint
12 gal. enamel
4 gal. shellac
14 gal. interior varnish
6 gal. shellac for floors
7 gal. floor varnish
2 gal. boiled oil
1 gal. alcohol
1 gal. benzine
5 lbs. putty
2 dozen sheets sandpaper
3 pkgs. steel wool
3 gal. cement floor paint

HEATING:

1 complete hot air plant, 20,000 cubic feet capacity, with hot and cold air flues with base registers.

PLUMBING:

1 sewer and water connection
1 floor drain
1 hot water tank
1 2 part laundry tub
1 ice box drain
1 sink
1 lavatory
1 bath tub
1 toilet
Complete roughing in and venting material

WIRING:

1 front entrance light, 1 switch
1 porch light, 1 switch
1 bell, 1 buzzer, 2 buttons
1 power outlet
25 light outlets
3 gas outlets
12 switch outlets
1 three-way outlet
9 receptacles

MATERIALS		ELECTRIC WIRING SYMBOLS			
CONCRETE		CEILING OUTLET		3 WAY SWITCH	
BRICK		DROP CORD		GAS OUTLET	
WOOD		BRACKET		PUSH BUTTON	
PLASTER		BASE PLUG		BELL OUTLET	
		SWITCH		BUZZER	

Dimensions are taken to outside of foundation walls, to outside of studs on exterior walls and center of studs for partition.

Foundation walls shown concrete may be stone, brick, concrete block or load bearing hollow tile.

Where building ordinances permit, foundation walls may be 9 in. thick (with 20x9-in. footings) except in case of stone which shall be 18 in. thick.

Stock numbers refer to mouldings in Universal Millwork Design Book No. 20 . In case these mouldings can not be procured, others of similar design and size may be substituted.

Provide 1⅛-in. screen and storm sash for all exterior openings except ice door unless otherwise noted. Bottom rail of storm sash to have vent.

Oldest Frame Buildings

FLUSHING, N. Y., Dec. 5, 1922.

To the Editor:

In looking over the NATIONAL BUILDER for November, 1922, I noticed an article "The Oldest Frame Building" built in 1684.

Here in Flushing, Long Island, not part of the city of New York, is a house built in 1661 by John Bowne, a noted Quaker of his time. This house is now occupied by some of the direct descendants of Bowne. The building is set low on the ground, of two stories, the second story being in the roof, which is of a gamble and gable type combined.

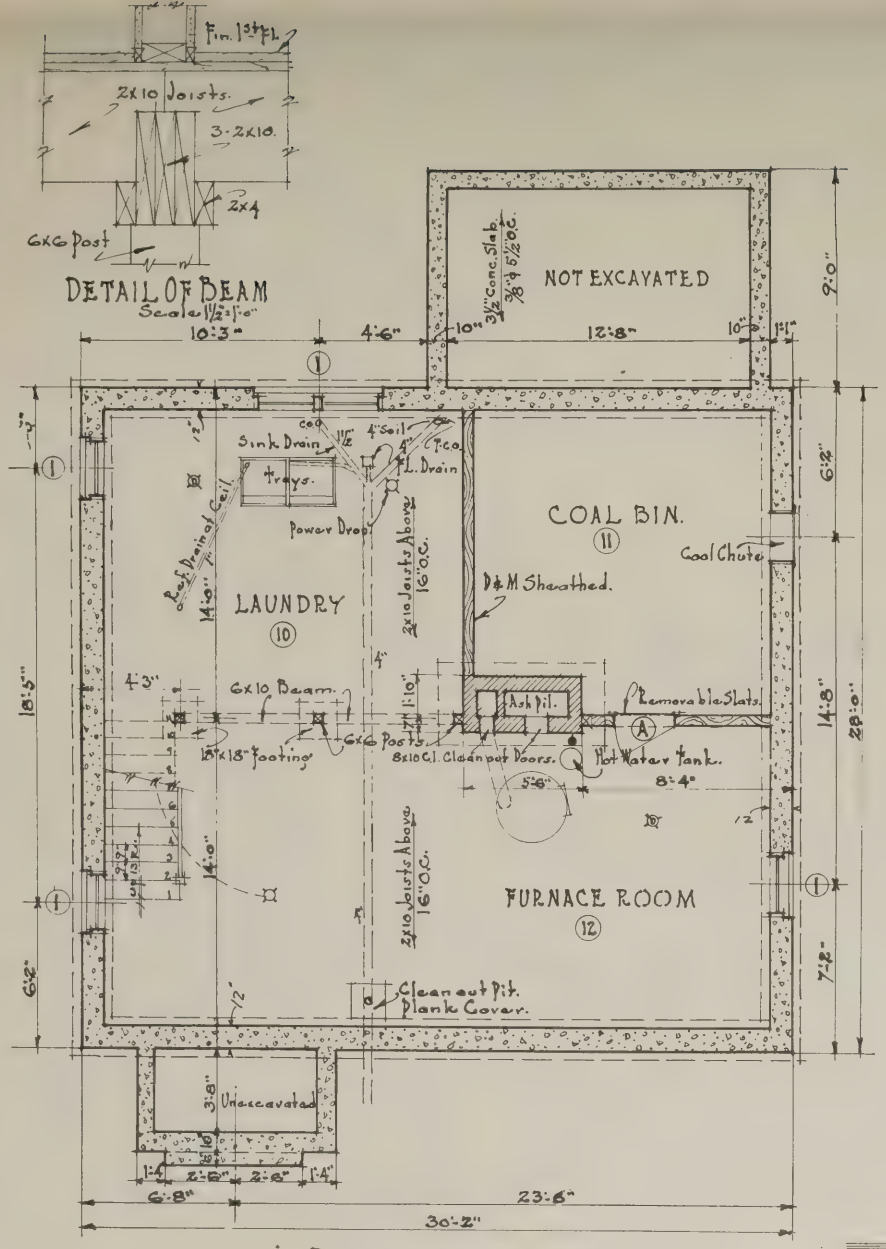
The house is in good preservation and has had modern improvements installed, but in such a manner as not to destroy the old appearance.

There is also another old building a short distance from the Bowne house, built in 1695, which is the Quaker Meeting House, in good preservation and is used by the Quakers at the present time as a meeting house.

It is a large two-story building with a steep hipped roof. Both buildings have shingled sides and are painted.

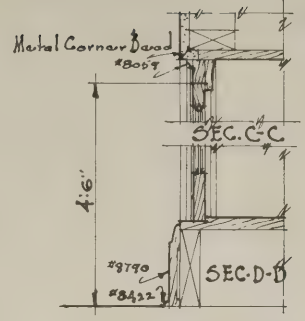
Hoping this will be of interest to you,

Yours very truly, J. W. DOBSON.

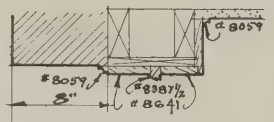


BASEMENT PLAN
Scale ¼"=1'-0"

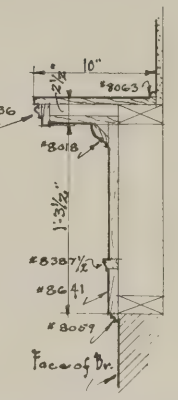
Scale reduced one-half



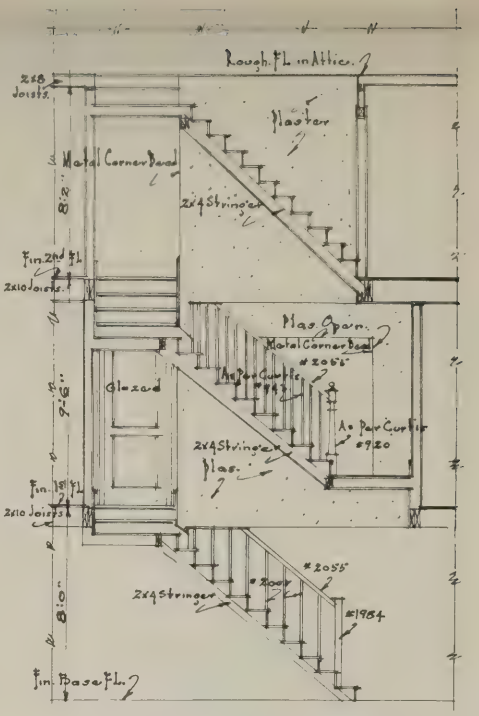
DETAIL OF BOOK CASE
Scale 1½"=1'-0"



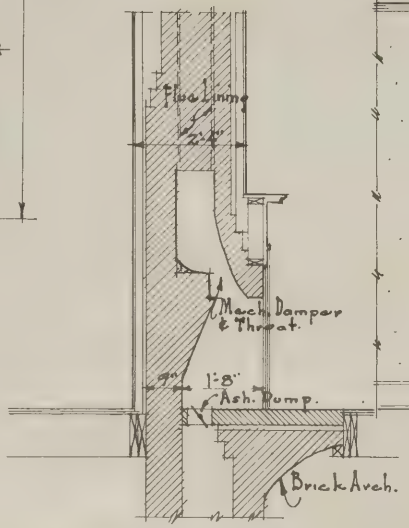
DETAIL AT B-B OF FIREPLACE



DETAIL AT A-A OF FIREPLACE
Scale 1½"=1'-0"



SECTION THRU STAIR
Scale ¼"=1'-0"



SECTION
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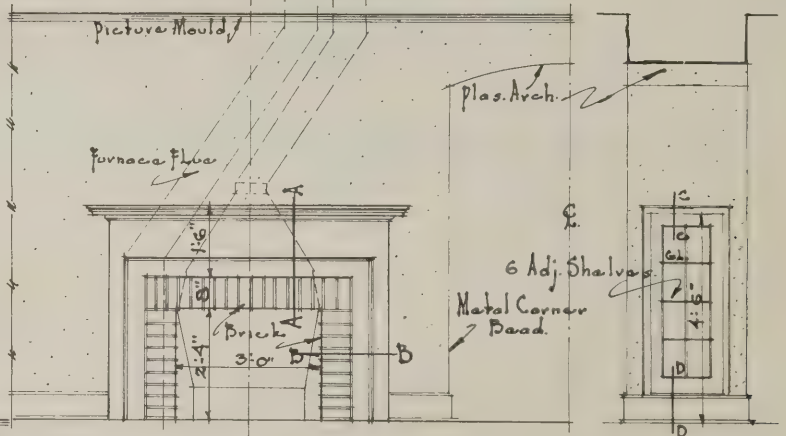


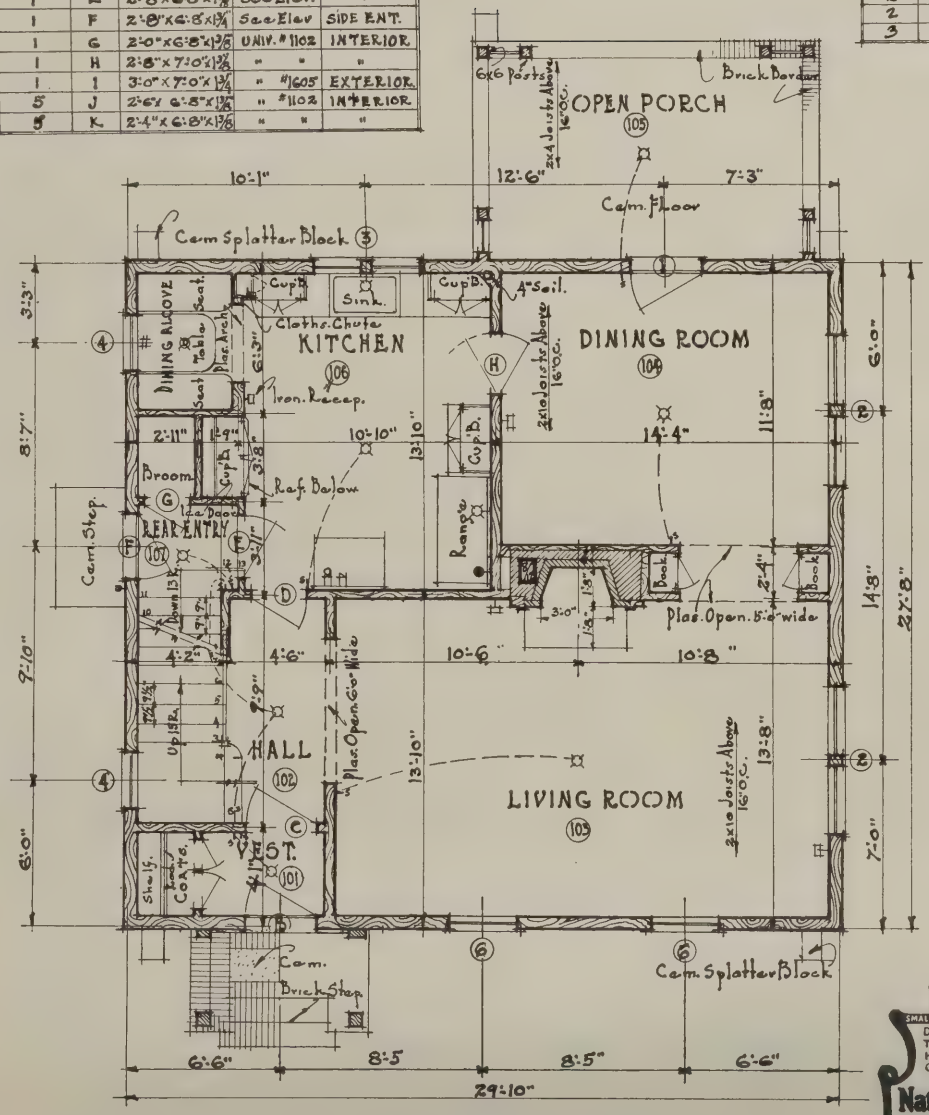
ELEVATION OF FIREPLACE
Scale ½"=1'-0"

ELEV. OF BOOKCASE

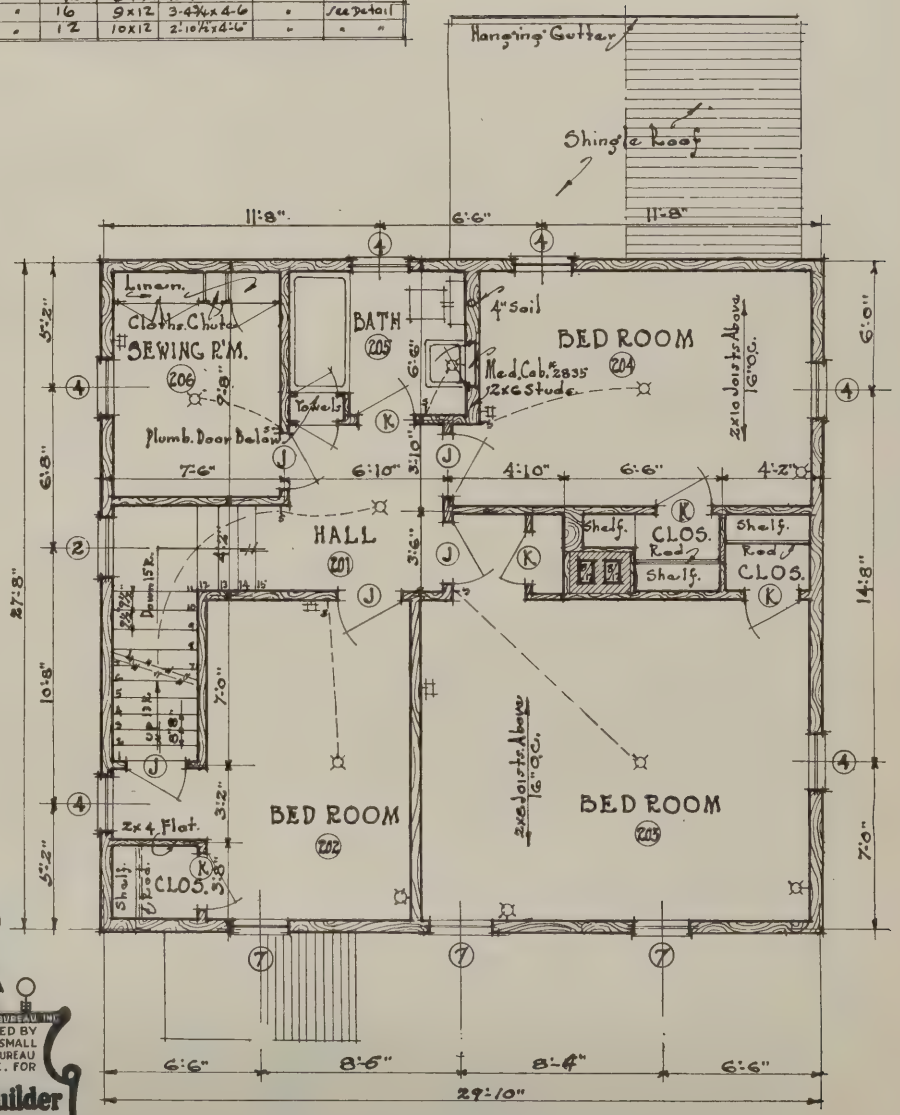
U.S.A.
ARCHITECTS
SMALL HOUSE SERVICE BUREAU INC
DESIGNS PREPARED BY THE ARCHITECTS SMALL HOUSE SERVICE BUREAU OF THE U.S. INC. FOR
National Builder
HOUSE NUMBER 6A46
©

SCHEDULE OF DOORS				
QUANTITY	TYPE	SIZE	DESCRIPTION	REMARKS
1	A	2'-6" x 6'-8" x 1 3/8"	UNIV. # 720	5 Panel.
1	B	3'-0" x 7'-0" x 1 3/4"	See ELEV.	Front.
1	C	3'-0" x 7'-0" x 1 3/4"	UNIV. # 1605	INTERIOR
1	D	2'-4" x 7'-0" x 1 3/8"	" # 1102	"
1	E	2'-8" x 6'-8" x 1 3/8"	See Elev.	"
1	F	2'-8" x 6'-8" x 1 3/4"	See Elev	SIDE ENT.
1	G	2'-0" x 6'-8" x 1 3/8"	UNIV. # 1102	INTERIOR
1	H	2'-8" x 7'-0" x 1 3/8"	" "	"
1	I	3'-0" x 7'-0" x 1 3/4"	" # 1605	EXTERIOR
5	J	2'-6" x 6'-8" x 1 3/8"	" # 1102	INTERIOR
5	K	2'-4" x 6'-8" x 1 3/8"	" "	"

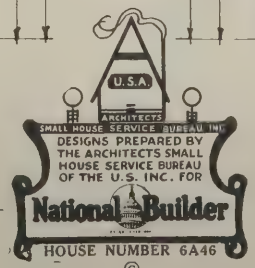
SCHEDULE OF WINDOWS							
QUANTITY	TYPE	DESCRIPTION	No. OF LIGHTS	SIZE GLASS	SIZE OF OPNG. FOR SASH	THICKNESS SASH	FRAME
3	1	Basement	3	8 x 10	2'-4" x 1'-3"	1 3/8	See Detail 2-1/4 Mullion Frame
5	2	Double Hung	12	10 x 14	2'-10 1/2" x 5'-2"	"	4-1/4 Mullion Frame
2	3	" "	8	10 x 8	2'-1" x 3'-2"	"	" "
8	4	" "	12	9 x 12	2'-7 1/2" x 4'-6	"	" "
2	5	" "	12	8 x 12	2'-4 1/2" x 4'-6	"	ROUND HEAD.
2	6	" "	16	9 x 12	3'-4 3/4" x 4'-6	"	See Detail
3	7	" "	12	10 x 12	2'-10 1/2" x 4'-6	"	" "



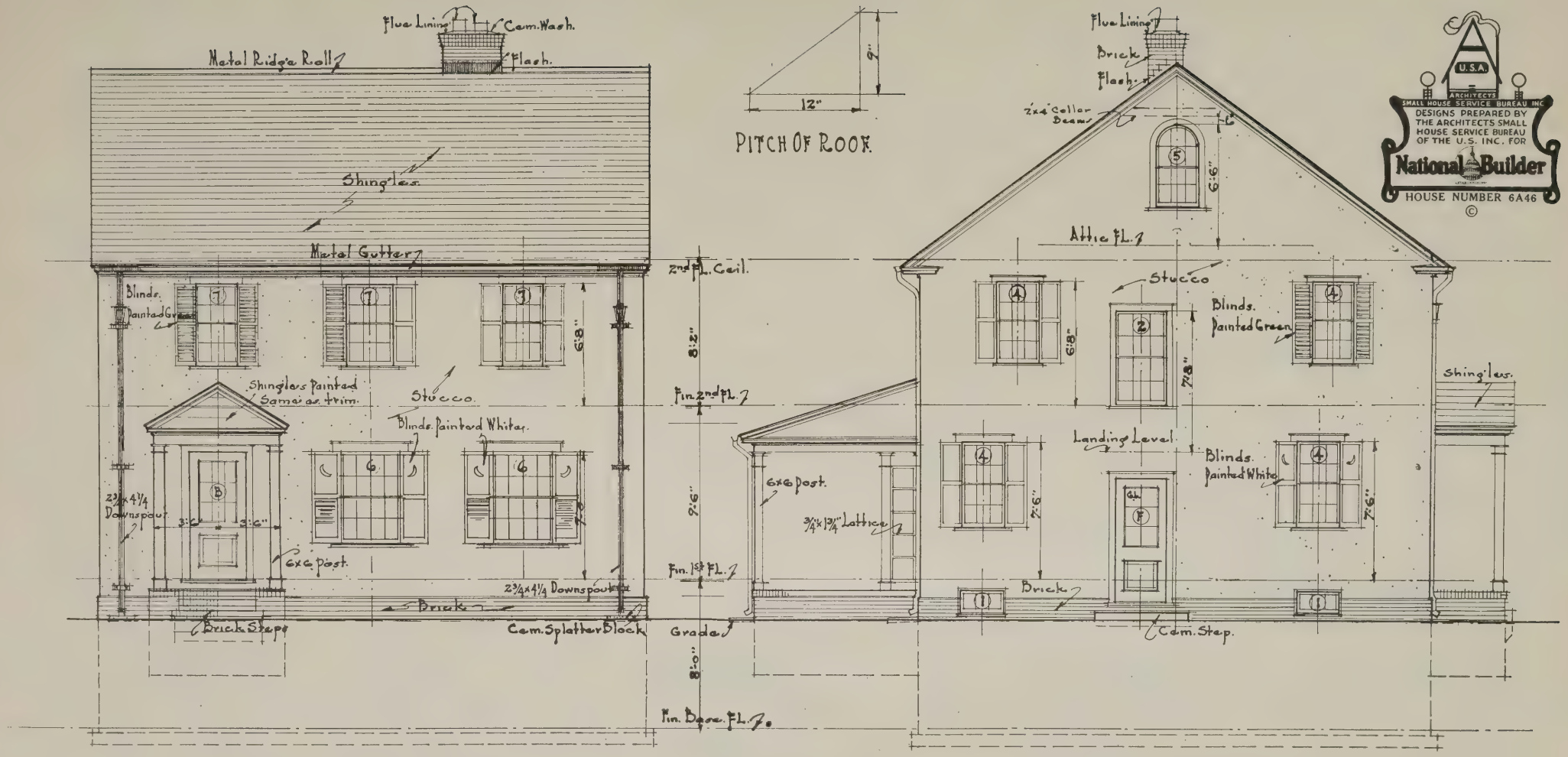
FIRST FLOOR PLAN
Scale 1/4" = 1'-0"



SECOND FLOOR PLAN.
Scale 1/4" = 1'-0"



Scale reduced one-half



FRONT ELEVATION
Scale ¼"=1'-0"

SIDE ELEVATION
Scale ¼"=1'-0"

Scale reduced one-half

U.S.A. ARCHITECTS
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National Builder
HOUSE NUMBER 6A46
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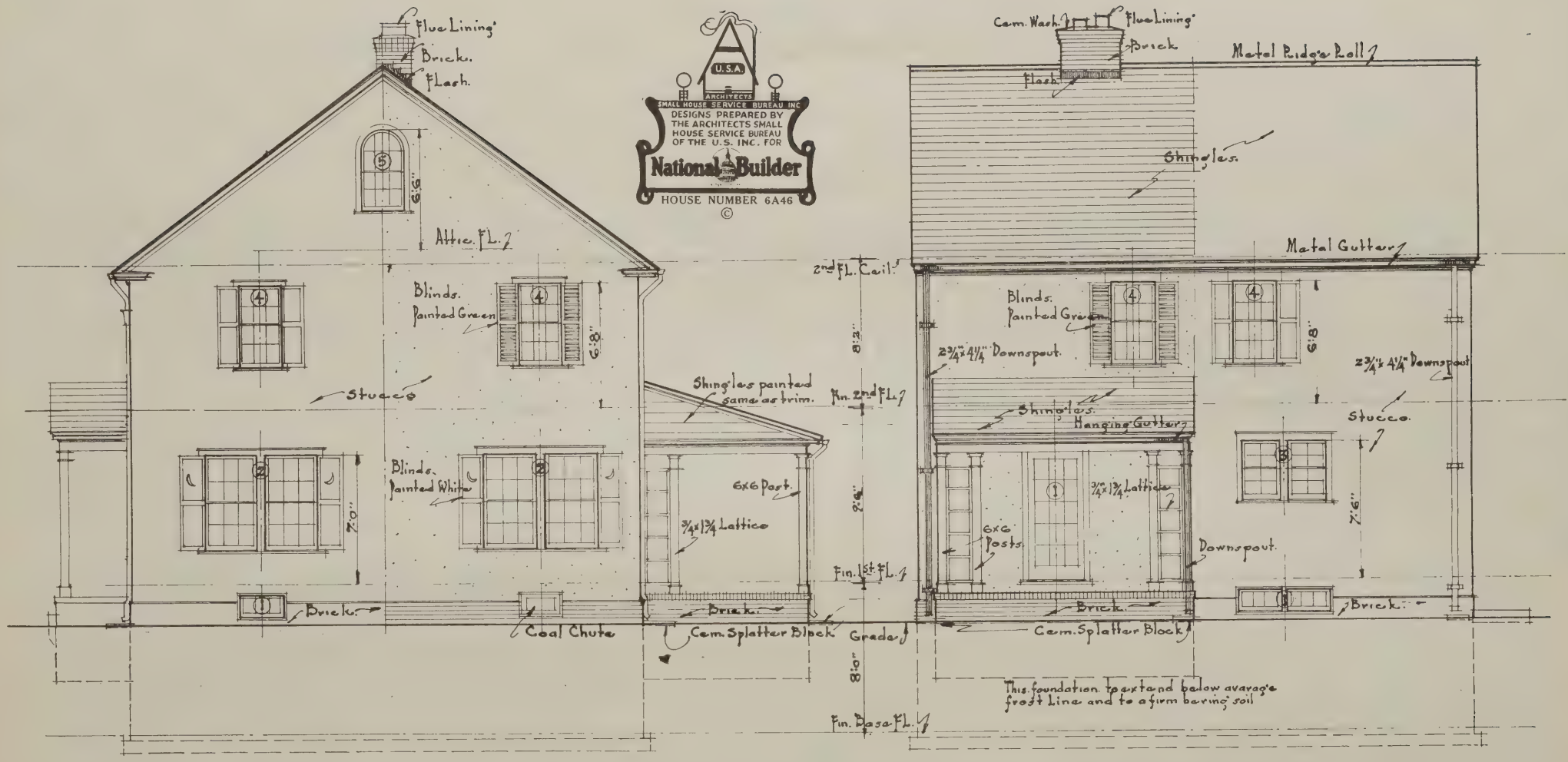
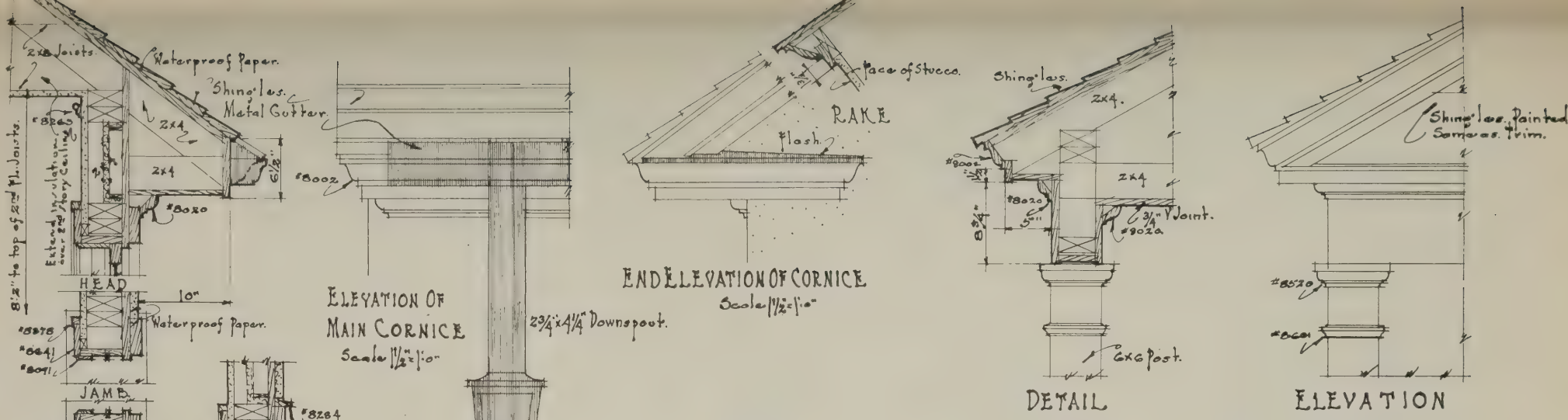


SIDE ELEVATION
Scale 1/4"=1'-0"

REAR ELEVATION
Scale 1/4"=1'-0"

Scale reduced one-half



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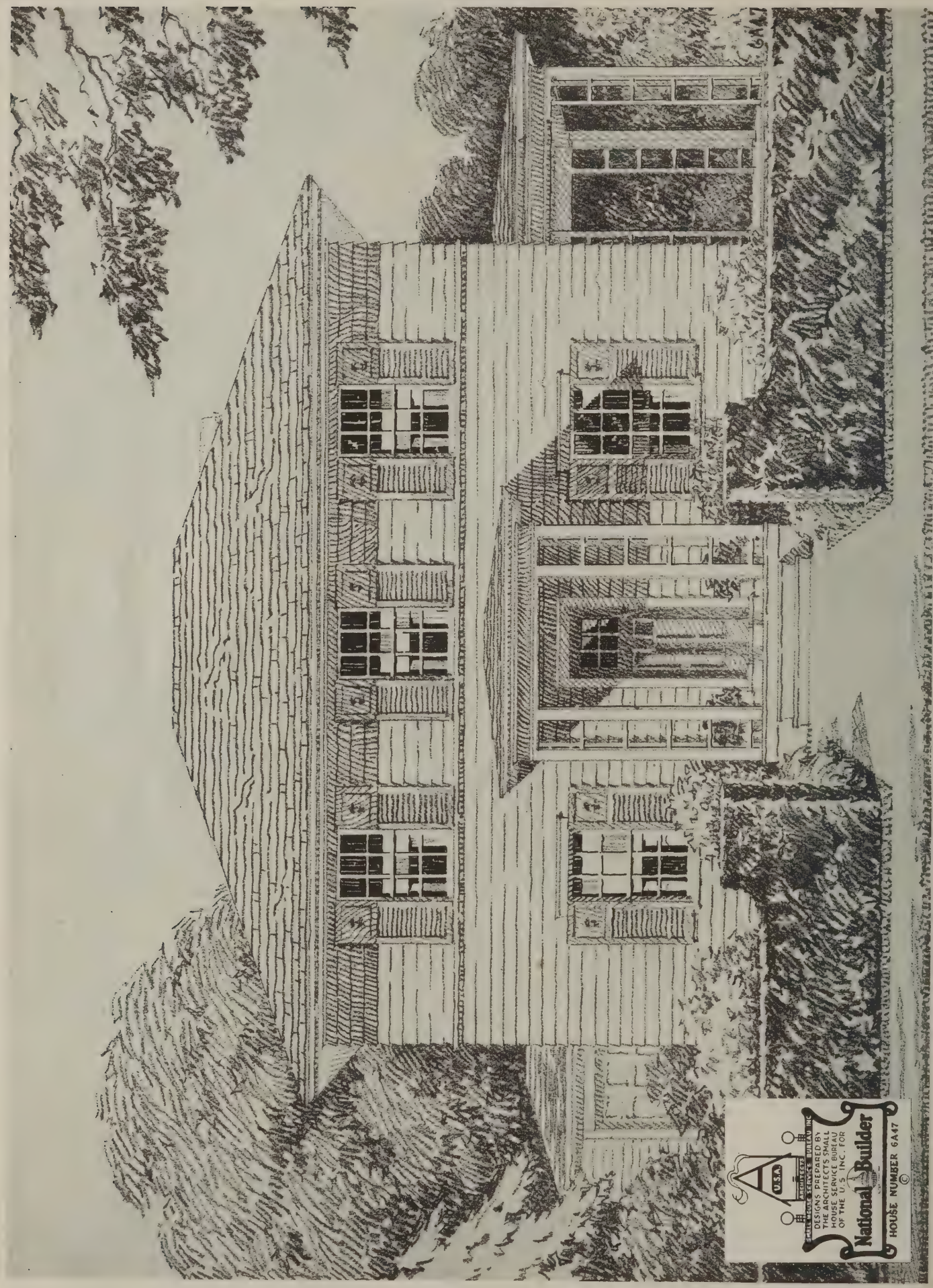
Scale reduced one-half


DESIGNS PREPARED BY THE ARCHITECTS SMALL HOUSE SERVICE BUREAU OF THE U. S. INC. FOR
National Builder
HOUSE NUMBER 6A47
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A Six-Room Frame House

House No. 6A47 Designed for National Builder by the Regional Service Bureaus of The Architects' Small House Service Bureau of the United States. This House Prepared by the Northwestern Division Regional Bureau

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COLONIAL influence is shown in this house in its frank and pleasingly dignified exterior. It is of frame construction with exterior wood siding and shingle roof. As the design and detail are extremely simple, this home of six rooms should be built at a reasonable figure. Yet it is so cleanly proportioned, the windows are so well placed and the details so carefully considered that when built it will present a most attractive appearance.

The notable feature of this design is the flexibility of the porch, which can be built in a variety of ways without the cost of making additional drawings. These changes are all provided for in the plan. This porch, which is 8'x16', can be built either at the side or put at the rear of the living room as desired. Then again it can be built either as a sunroom or open porch, and have a sleeping porch above the sunroom if desirable. These details are all given in the working drawing.

The position of the porch will naturally influence the size of the lot. If it is placed at the side the house will require a 50 ft. lot. If it is placed at the rear, the house can be built upon a lot with 40 ft. to 45 ft. frontage.

This type of house lends itself to an especially compact, convenient arrangement of room without waste of space.

The unusually large living room, 13'x 23' 6", is made more attractive by the fireplace at the end with book cases at either side, and by the double French doors opening onto the porch or sunroom.

Wide cased openings between living room, hall and dining room increase the spacious effect of the first floor.

There is a scientifically planned kitchen, with well-placed cupboards and built-in ice box.

A surprising number of closets are provided without taking valuable space from the area of the rooms. There is a coat closet in the front vestibule, large closet for each bedroom and two large closets in the owner's room, linen closet in bathroom and another in the hall. The plan provides a complete basement.

The three good bedrooms each have cross ventilation, and the bathroom is conveniently located.

This home can face north or west, or can be reversed for other facing. Reversed plans are provided without extra charge. The regular price of this plan is $30. Half price to NATIONAL BUILDER subscribers.

Specifications and Quantity Survey

EXCAVATING: 210 cu. yds.

BACK FILL: 30 cu. yds.

FOUNDATION:

If 12" concrete, 44 cu. yd. gravel, 178 sax cement
If 9" concrete, 36 cu. yd. gravel, 146 sax cement
If 12" tile, 21,000 CBM tile, 15 cu. yds. mortar
If 9" tile, 16,800 CBM tile, 12 cu. yds. mortar

CEMENT FLOOR:

5 cu. yds. gravel
4 cu. yds. sand
55 sax cement
4—18x18 cement spatter blocks

CHIMNEY:

1800 common brick
1500 face brick
130 fire brick
3 cu. yds. mortar
6 sq. yds. metal lath
64 lin. ft. 8x12 flue tile
2—8x10 clean outs
3—6" adjustable thimbles
14 sq. ft. hearth tile
25 lb. fire clay
1 cast iron ash dump
1 throat and damper
1—4x3x5/16 angle iron
200 inside face brick

LATH:

10400M lath
9 yds. metal lath over boiler

INTERIOR PLASTER:

745 sq. yds. walls and ceiling
14 sq. yds. Keene's cement

EXTERIOR FOUNDATION PLASTERING:

20 sq. yds.

TILE FLOORS:

50 sq. ft. ceramic floor
27 lin. ft. tile cove base

LUMBER:

7—6x6- 7 posts
2—4x4- 7 posts
2—6x8-20 girders
7—6x6-1'6 post caps
2—2x4-18 basement partition plates
16—2x4- 7 basement partition studs
360 ft. D&M basement partn. sheating two sides
4 ft. plank clean out cover
3—2x10-14 stair horses
2—2x 4- 7 stair rail
2—1x 6- 9 stair rail ribbon
2—2x 4- 4 stair rail braces
11—2x12- 4 stair treads
20—2x10-14 first floor joist
20—2x10-12 first floor joist
20—2x10- 6 first floor joist
50 lin. ft. 2x10 box sill
230 lin. ft. bridging 1x3
4—2x 6- 9 porch joists
7—2x 6-16 porch joists
1—6x 6- 9 porch girder
2—2x 6-16 landing joist
4—2x10-14 first floor joist headers
2—2x10-16 first floor joist doubles
800 ft. com. bds. 1st floor subfloor
900 ft. 13/16x1¼ finish floor
50 lin. ft. 1x4 ribbon
324 lin. ft. 2x4 outside wall plates
89—2x4-18 outside wall studs
32—2x4- 7 opening doubles
4—2x4-16 opening headers
300 ft. ⅞x4 fir flooring porch
300 ft. ⅝x4 ceiling porch
3—2x10-12 step horses
2—2x 8- 9 porch girders
4—2x 8- 4 porch girders
2—2x10-16 porch girders
4—2x10- 8 porch girders
8—2x 4- 6 porch ceiling joist
13—2x 4-10 porch ceiling joist
25—2x 4-16 look outs, etc.
4—2x 4-14 headers
2—2x 4- 9 porch hip rafters
2—2x 4-14 porch hip rafters
10—2x 4- 6 porch rafters
15—2x 4-10 porch rafters
232 lin. ft. 2x4—1st floor partition plates
68—2x 4- 9 first floor partition studs
2—2x10- 6 opening girders
2—2x10- 5 opening girders
3—2x10-16 stair horses
20—2x10-14 second floor joist
20—2x10-18 second floor joist
4—2x10-16 second floor joist headers
318 lin. ft. 2x4 second floor partition plates
93—2x4-8 second floor partition studs
800 ft. com. bds. second floor sub-floor
820 ft. 13/16x1½ second floor finish floor
37—2x6-11 second floor ceiling joist
17—2x6-14 second floor ceiling joist
760 ft. D&M attic floor
4—2x6-20 hip rafters
1—1x8- 8 ridge rafter
4—1x6-10 rafter braces
108 lin. ft. 2x4 rafter plates
1800 ft. com. bds. roof sheating
13¾M shingles roof
2200 ft. shiplap wall sheating
2000 ft. siding
450 ft. ⅝x4 ceiling plancier
25—2x 4-16 scaffold and extras
16—2x 4-14 scaffold and extras
8—2x10-16 scaffold and extras
5—2x 8-16 scaffold and extras

MILLWORK—Frames:

6 sash frames 7x9-3L-1¾
1 sash frame 10x12-6L-1⅜
7 single frames 10x12-12L-1⅜
2 single frames 8x10-12L-1⅜
1 mul. frame 8x10-12L-1⅜
4 single frames 10x13-12L-1⅜

Windows:

6 sash 7x 9- 3L-1¾
1 sash 10x12- 6L-1⅜
7 wds. 10x12-12L-1⅜
4 wds. 8x10-12L-1⅜
4 wds. 10x13-12L-1⅜

Storm Sash:

6 st. sh. 7x 9- 3L-1⅛
1 st. sh. 10x12- 6L-1⅛
7 st. sh. 10x12-12L-1⅛
4 st. sh. 8x10-12L-1⅛
4 st. sh. 10x13-12L-1⅛

Screens:

6 screens 7x 9- 3L-1⅛
1 screen 10x12- 6L-1⅛
7 screens 10x12-12L-1⅛
4 screens 8x10-12L-1⅛
4 screens 10x13-12L-1⅛

Shutters:

3 pr. shutters for windows 10x13-12L-1⅛
1 pr. shutters for windows 8x10-12L-1⅛
6 pr. shutters for windows 10x12-12L-1⅛

Outside Door Frames:

1 dr. fr. 2-10x7'0-1¾
2 dr. fr. for pair of doors, each 2'0x7'0-1¾

1 dr. fr. 2'8x6'10-1¾
1 icing door frame

Outside Doors:

1 door 2'10x7'0 1¾ No. 1246- 6L-PP
4 door 2'0 x7'0 -1¾ No. 1600-10L-DS
1 door 2'8 x6'10-1¾ No. 970- 4L-DS
1 icing door

Storm Doors:

1 st. dr. 2'10x7'0-1⅛
2 pr. st. doors opening 4'0x7'0-1⅛
1 st. dr. 2'8x6'10-1⅛

Screen Doors:

1 screen door 2'10x7'0 -1⅛ fancy
1 screen door 2'8 x6'10-1⅛ plain
4 screen doors 2'0 x7'0 -1⅛ fancy

Exterior Millwork:

1 set front steps, 6'0
2 set front steps, 7'0
2 lattice strips 1'3x8'6
2 lattice strips 3'3x8'6
6 lattice strips 1'4x8'6
108 lin. ft. water drip
2 astrogals
192 lin. ft. cornice
2—4'3 wood steps
1—3'6 wood steps
74 lin. ft. porch ceiling cove
50 lin. ft. porch soffit and trim

Interior Doors:

1 door 2'10x7'0 -1¾ No. 1272-10L-PP
1 door 2'4 x7'0 -1⅜ No. 1102
1 door 2'6 x6'6 -1⅜ No. 1102
6 door 2'6 x6'10-1⅜
4 door 2'4 x6'10-1⅜
1 door 2'0 x3'0 -1⅜ Special
1 door 2'8 x6'6 No. 720

Jambs:

1 jamb 2'10x7'0
1 jamb 2'4 x7'0
1 jamb 2'6 x6'6
6 jamb 2'6 x6'10
4 jamb 2'4 x6'10
1 jamb 2'0 x3'0
1 jamb 2'8 x6'6
1 jamb 5'0 x7'0
1 jamb 4'0 x7'0

Interior Trim:

6 side trim 7x 9- 3L
1 side trim 10x12- 6L
7 side trim 10x12-12L
2 side trim 8x10-12L
1 side mul. trim 8x10-12L
4 side single trim 10x13-12L
1 side door trim 2'10x7'0
2 side double door trim 2'0x7'0
1 side door trim 2'8x6'10
1 side icing door trim
2 side trim 2'10x7'0
2 side trim 2'4 x7'0
2 side trim 2'6 x6'6
12 side trim 2'6 x6'10
8 side trim 2'4 x6'10
1 side trim 2'0 x3'0
2 side trim 2'8 x6'6
2 side trim 5'0 x7'0
2 side trim 4'0 x7'0
1 flight main stairs with rail
1 scuttle door, jamb and trim
1 linen closet complete with door, jamb & trim
1 medicine cabinet No. 2835
1 mantle
2 book cases
1 meter cabinet
1—3'0 kitchen cupboard
2—3'0 kitchen cupboard
1 grade stair
44 lin. ft. closet shelving
44 lin. ft. closet hook strip
22 lin. ft. closet clothes pole
70 lin. ft. chair rail
560 lin. ft. base
560 lin. ft. base moulding
560 lin. ft. base shoe
280 lin. ft. picture moulding
124 lin. ft. ceiling cove
24 lin. ft. threshold
2 drain boards

Hardware:

6 cellar sash sets
15 sash locks
15 sash lifts
22 storm sash sets
22 screen sets
10 sets shutter hardware for pairs
1 front door set with butts
1 rear door set with butts
2 double door set with butts
1 icing door set
6 storm door sets
6 screen door sets
1 floor hinge
2 push plates
14 inside door sets with butts
20 door bumpers
6 stair brackets

1 pr. ornamental butts } medicine cabinet
1 cupboard turn }
4 friction stays—utility door
1 cupboard turn } scuttle door
1 pr. hinges }
6 drawer pulls
1 pr. ornamental butts } linen closet
1 cupboard turn
1 cupboard turn } meter cabinet
1 pr. ornamental butts }
6 pr. ornamental butts
3 cupboard turns
3 blind catches } kitchen cabinets
8 drawer pulls
1 bin pull
4 doz. clothes hooks
375 lb. sash weights
3 hanks sash cord
1050 lb. assorted nails
10 lb. assorted brads
1 coal chute
6 doz. shelf holders
2 doz. sheets assorted sand paper

INSULATION:

1750 ft. for walls
700 ft. for ceiling
3 rolls red rosin for floors
4 rolls tar felt walls
3 rolls tar felt roof

WEATHER STRIPPING:

6 sash 7x 9x 3L
1 sash 10x12- 6L
7 wds. 10x12-12L
4 wds. 8x10-12L
4 wds. 10x13-12L
1 door 2'10x7'0
4 door 2'0 x7'0
1 door 2'8 x6'10

CAULKING:

7 sash
15 windows
6 doors
1 icing door
1 coal chute
40 lin. ft. chimney

EXTERIOR PAINTING

30 gal. shingle stain
5 gal. trim paint
20 gal. body paint
2 gal. oil
1 gal. turpentine
1 qt. orange shellac
1 gal. porch floor paint
½ gal. sash color
½ gal. screen color
¼ gal. shutter paint
6 lb. putty

INTERIOR PAINTING:

13 gal. white paint
11 gal. enamel
4 gal. shellac
13 gal. interior varnish
6 gal. floor shellac
7 gal. floor varnish
2 gal. boiled oil
1 gal. benzine
5 lb. putty
1½ gal. alcohol
2 doz. sheets sandpaper
3 packages steel wool

HEATING:

1 complete hot air heating plant with hot and cold air intakes with base registers

TINWORK:

7 lin. ft. ridge roll
2 finials
1 saddle
3 sheets sheet tin
400 tin shingles
192 lin. ft. gutter
40 gutter hangers
8 meters
4 gutter ends
8 nipples
6 offsets
6 elbows
4 shut offs
8 strainers
90 lin. ft. conductor
14 conductor straps
20 lin. ft. 4" gas vent
1 flower box lining

PLUMBING:

1 sewer and water connection
1 clean out pit
1 floor drain—2 sill cocks
1—2 part laundry tub
1 ice box waste
1 hot water tank
1 sink
1 toilet
1 lavatory
1 bath tub
Complete roughing in and venting materials

WIRING:

1 bell and buzzer
1 power outlet
2 gas outlets
4 three ways
12 base outlets
19 light outlets
11 switch outlets

MATERIALS		ELECTRIC WIRING SYMBOLS			
CONCRETE		CEILING OUTLET		3 WAY SWITCH	
BRICK		DROP CORD		GAS OUTLET	
WOOD		BRACKET		PUSH BUTTON	
PLASTER		BASE PLUG		BELL OUTLET	
		SWITCH		BUZZER	

Dimensions are taken to outside of foundation walls, to outside of studs on exterior walls and center of studs for partition.

Foundation walls shown concrete may be stone, brick, concrete block or load bearing hollow tile.

Where building ordinances permit, foundation walls may be 9 in. thick (with 20x9-in. footings) except in case of stone which shall be 18 in. thick.

Stock numbers refer to mouldings in Universal Millwork Design Book No. 20 . In case these mouldings can not be procured, others of similar design and size may be substituted.

Provide 1⅛-in. screen and storm sash for all exterior openings except ice door unless otherwise noted. Bottom rail of storm sash to have vent.

TO TAKE STAINS OUT OF MARBLE—Take ox-gall, wineglassful of soap lees, one-half wineglassful of turpentine; mix and make into a paste with pipe clay. Put the paste over the stain and let it remain for several days. If the stain is not fully removed, a second application will generally prove sufficient.

Area Covered by 1,000 Shingles

THIS table shows the number of square feet 1,000 shingles will cover:

Laid	Area Covered	Number to a Square
4 in. to weather.....	100 sq. ft.	1,000
4¼ in. to weather.....	110 sq. ft.	910
4½ in. to weather.....	120 sq. ft.	833
4¾ in. to weather.....	133 sq. ft.	752

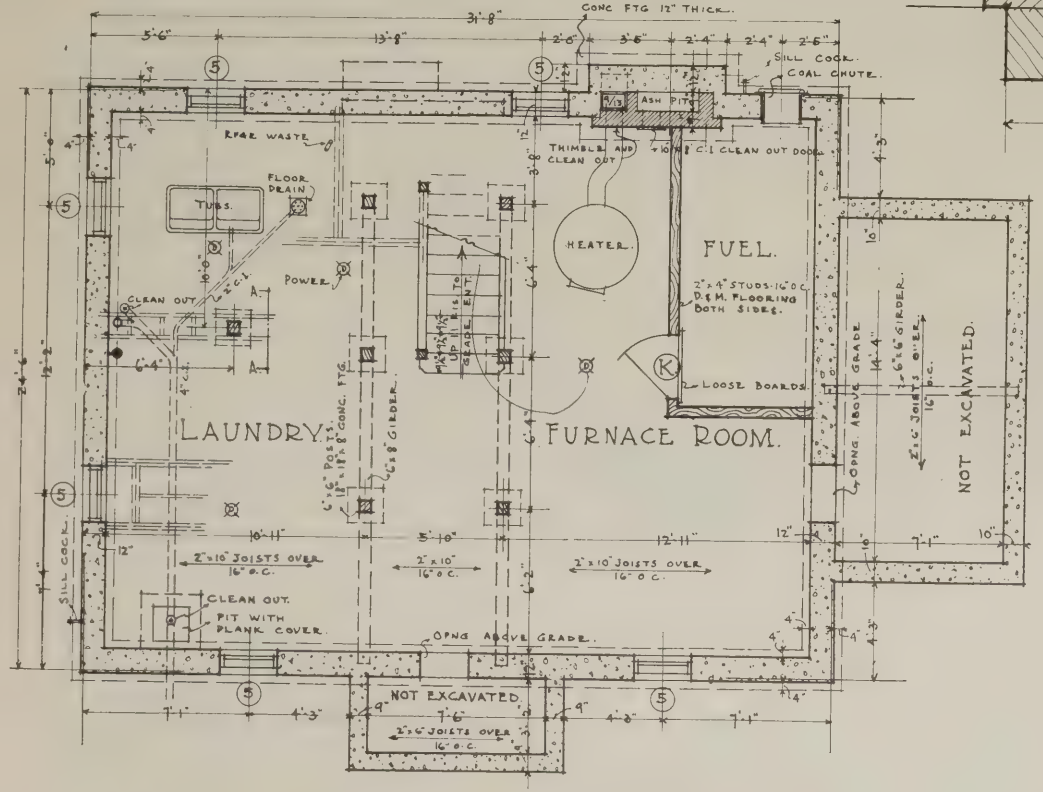
On hips and dormers or for four valleys add 5 per cent for cutting; on irregular roofs with dormers add 10 per cent. An average shingler should lay 1,300 shingles in eight hours, on irregular roofs 900. Five pounds 3d nails to 1,000 shingles.

SCHEDULE OF DOORS.

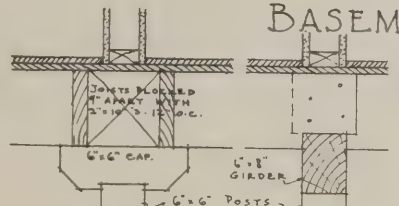
QUANTY	TYPE	SIZE	DESCRIPTION	REMARKS
1	A	2'-10" x 7'-0" x 1¾"	#1246 OAK.	6 LTS. PL. GL.
2	B	TWO - EACH 2'-0" x 7'-0" x 1¾"	#1600 PINE	10 LTS. D.S. GL.
1	C	2'-8" x 6'-10" x 1¾"	#970 PINE	4 LTS. D.S. GL.
1	D	2'-10" x 7'-0" x 1¾"	#1272 BIRCH	10 LTS. PL. GL.
1	E	2'-4" x 7'-0" x 1⅜"	#1102 "	
1	F	2'-6" x 6'-6" x 1⅜"	" "	
6	G	2'-6" x 6'-10" x 1⅜"	" "	
4	H	2'-4" x 6'-10" x 1⅜"	" "	
1	J	2'-0" x 3'-0" x 1⅜"	SPECIAL	ONE PANEL
1	K	2'-8" x 6'-6" x 1⅜"	#720 PINE	

SCHEDULE OF WINDOWS.

QUANTY	TYPE	DESCRIPTION	NO OF LIGHTS	SIZE OF GLASS	SIZE OF OPNG FOR SASH	THICKN'S SASH	FRAME
4	#1	DBL HUNG	12	10 x 13	2'-10½" x 4'-10"	1⅜"	SEE DETAIL
4	#2	" "	12	8 x 10	2'-4½" x 3'-10"	"	"
7	#3	" "	12	10 x 12	2'-10½" x 4'-6"	"	"
1	#4	FIXED SASH	6	10 x 12	2'-10" x 2'-5"	"	"
6	#5	HINGED SASH	3	7 x 9	2'-1" x 1'-2"	1¾"	"
	#6	SEE ELEVATIONS OF SUN ROOM.					
	#7	SEE ELEVATIONS OF SLEEPING PORCH					

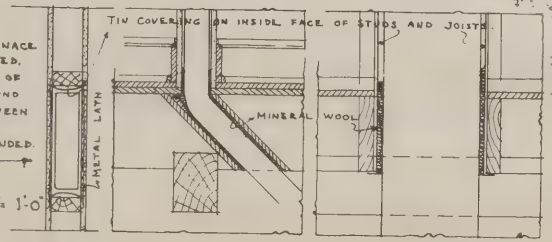


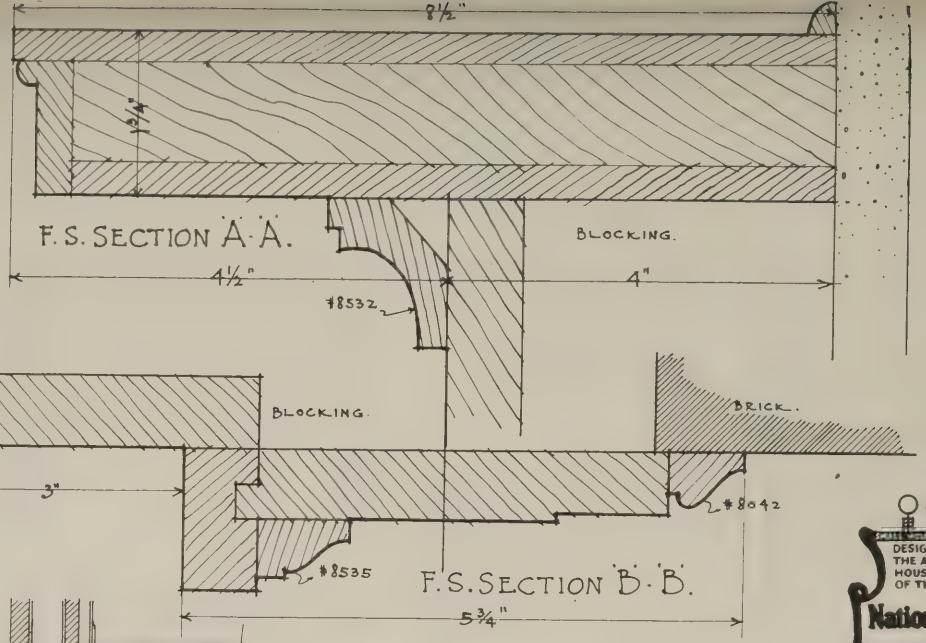
BASEMENT PLAN. SCALE ¼" = 1'-0"

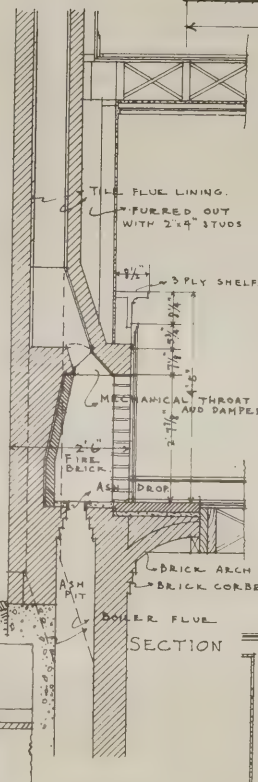


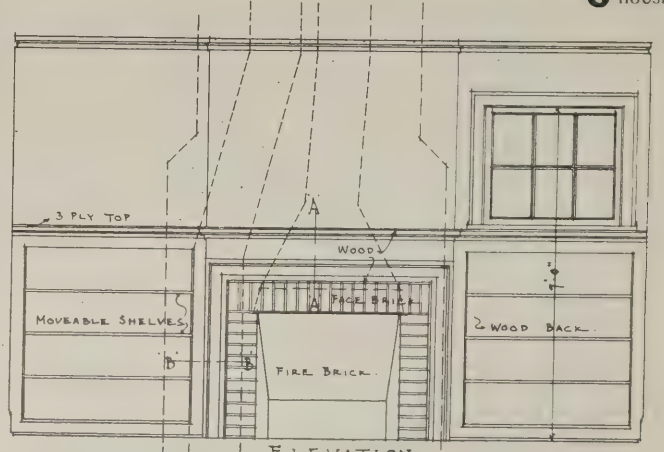
SECTION AA. TYPICAL 6"x6" DETAIL OF POST AND GIRDER. SCALE 1" = 1'-0"

IN CASE HOT AIR FURNACE AND PIPING ARE USED, THIS CONSTRUCTION OF FIRE STOPPING AROUND PIPES PASSING BETWEEN FLOOR JOISTS AND STUDS IS RECOMMENDED.

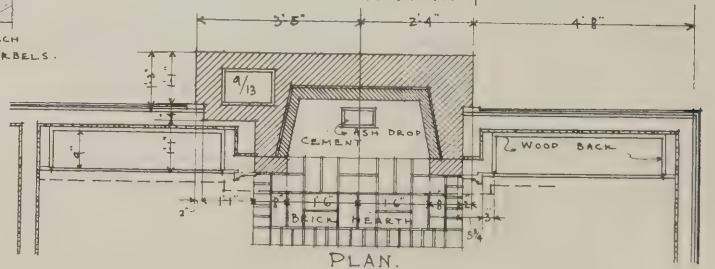








ELEVATION.



PLAN.

DETAILS OF FIREPLACE. SCALE ½" = 1'-0"

0 1 2 3 4 5 6 7 8 - ¼" = 1'-0"
0 1 2 3 4 ½" = 1'-0"
0 ½ 1 1½ 2 1" = 1'-0"

Scale reduced one-half

U.S.A. ARCHITECTS' SMALL HOUSE SERVICE BUREAU INC.
DESIGNS PREPARED BY THE ARCHITECTS SMALL HOUSE SERVICE BUREAU OF THE U.S. INC. FOR
National Builder
HOUSE NUMBER 6A47
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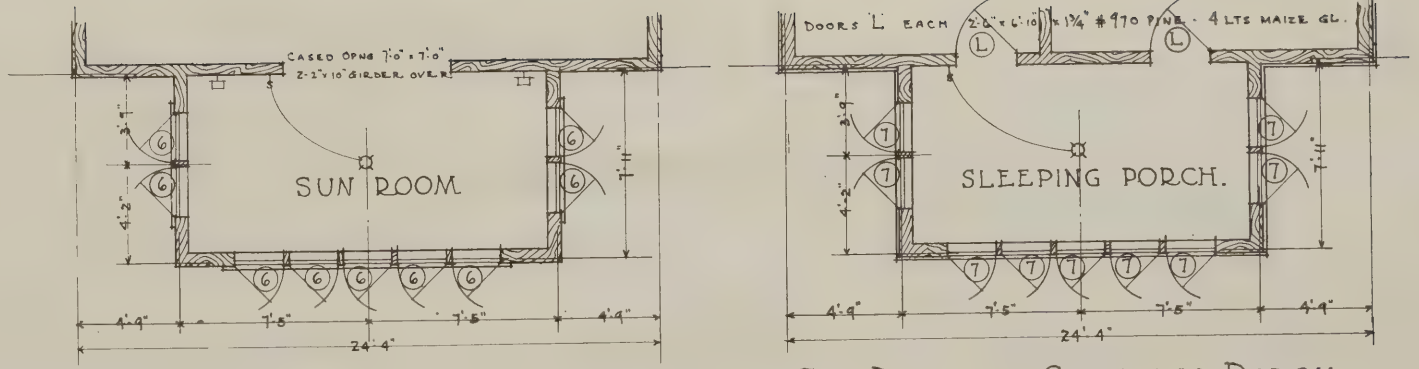
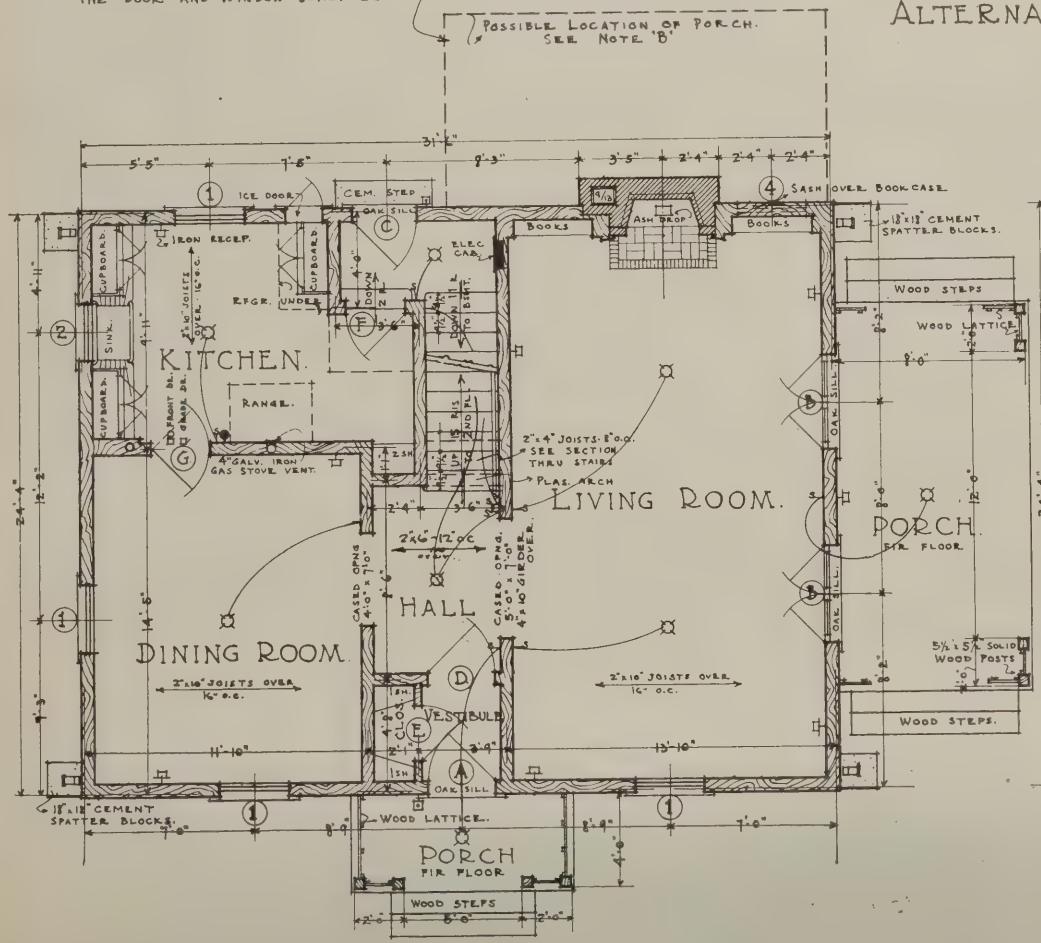
NOTE A IF THE OWNER SO DESIRES THE SUN ROOM, OR THE SUN ROOM WITH THE SLEEPING PORCH OVER, MAY BE SUBSTITUTED FOR THE OPEN PORCH SHOWN WITH THE FLOOR PLANS. SEE ALTERNATE PLANS AND ELEVATIONS FOR SUN ROOM AND SLEEPING PORCH

NOTE B IF THE OWNER SO DESIRES EITHER THE OPEN PORCH, OR THE SUN ROOM, OR THE SUN ROOM WITH THE SLEEPING PORCH OVER, MAY BE PLACED HERE AS INDICATED BY THE DOTTED LINES. IF THIS IS DONE, MOVE THE FIREPLACE TO THE OUTSIDE WALL OPPOSITE THE LIVING ROOM ENTRANCE AND MAKE PROPER REVISIONS TO THE DOOR AND WINDOW SCHEDULES.

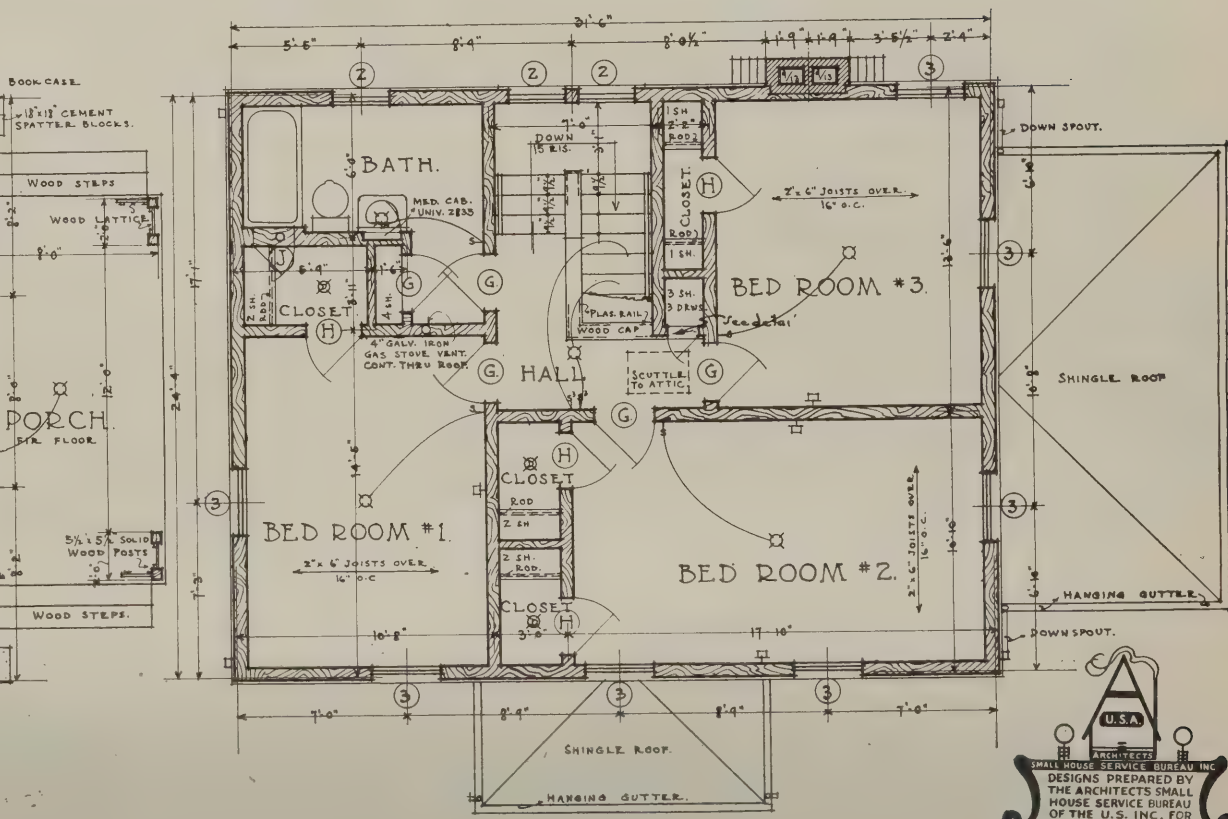


ALTERNATE PLANS FOR SUN ROOM AND SLEEPING PORCH.
SEE NOTE 'A'.



FIRST FLOOR PLAN.

SCALE - ¼" = 1'-0"



SECOND FLOOR PLAN.

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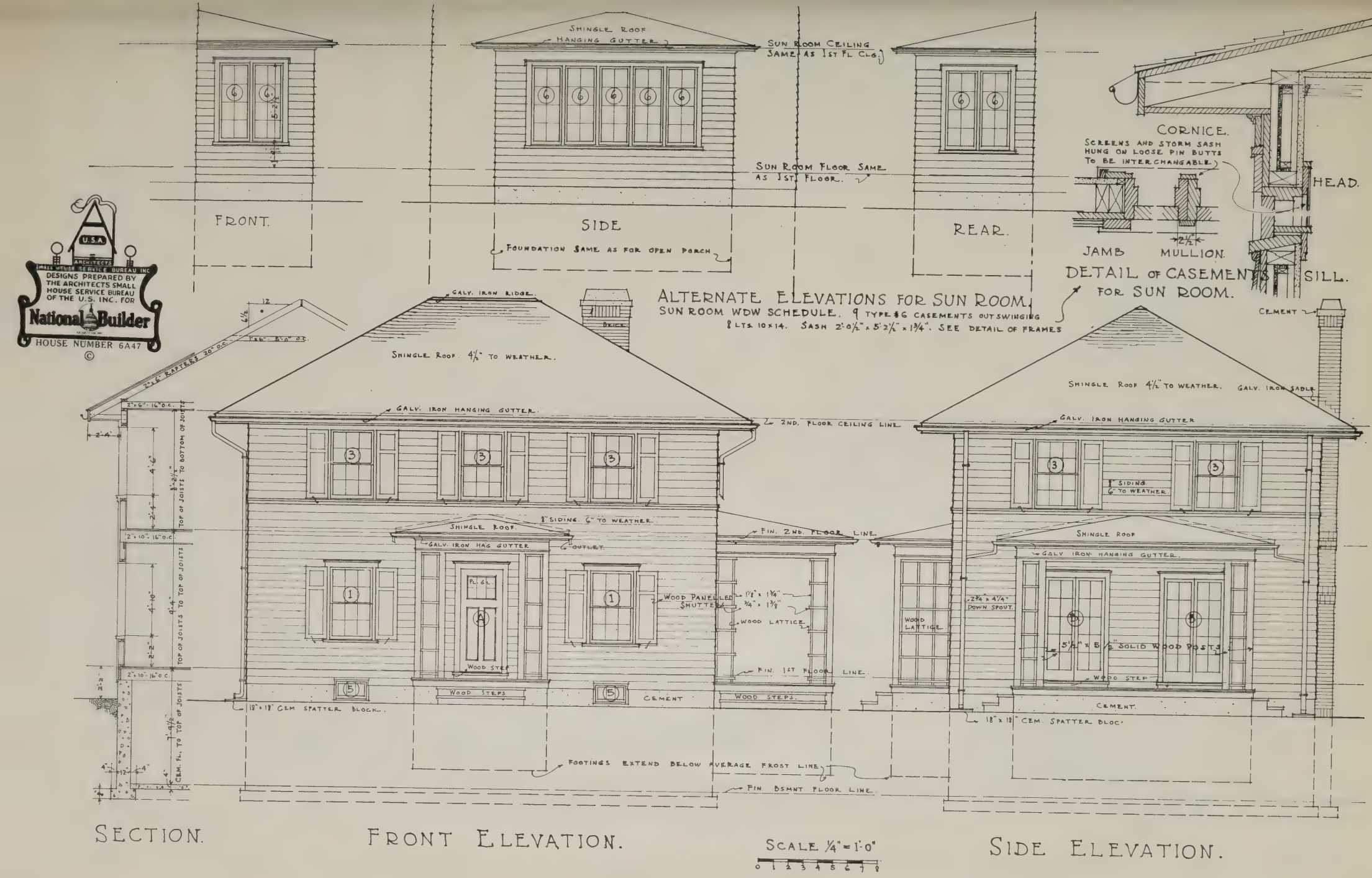

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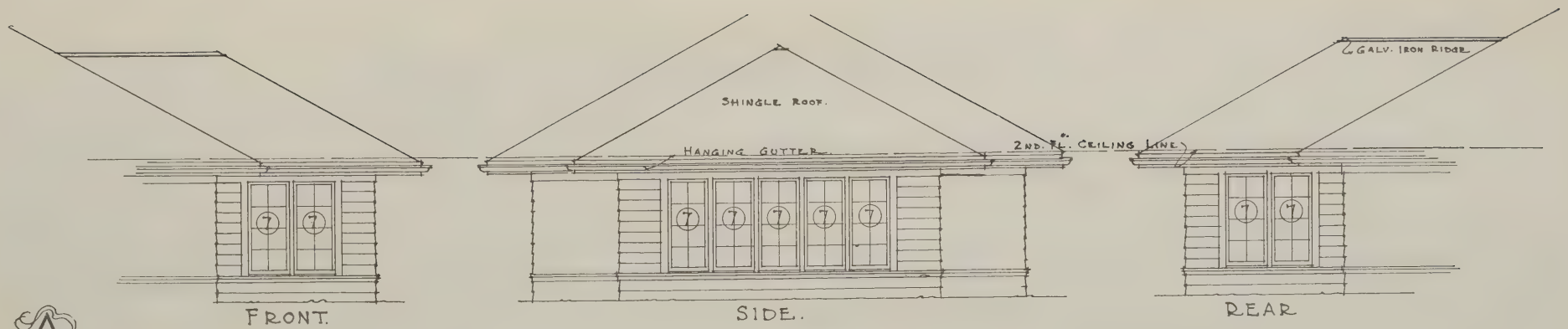

ALTERNATE ELEVATIONS FOR SLEEPING PORCH.

SLEEPING PORCH WDW. SCHEDULE. - 9 TYPE #7 CASEMENTS. OUTSWING'G. 8 LTS. 10x12. SASH 2'-0½" x 4'-6" x 1¾". FRAMES SIMILAR TO SUN ROOM.

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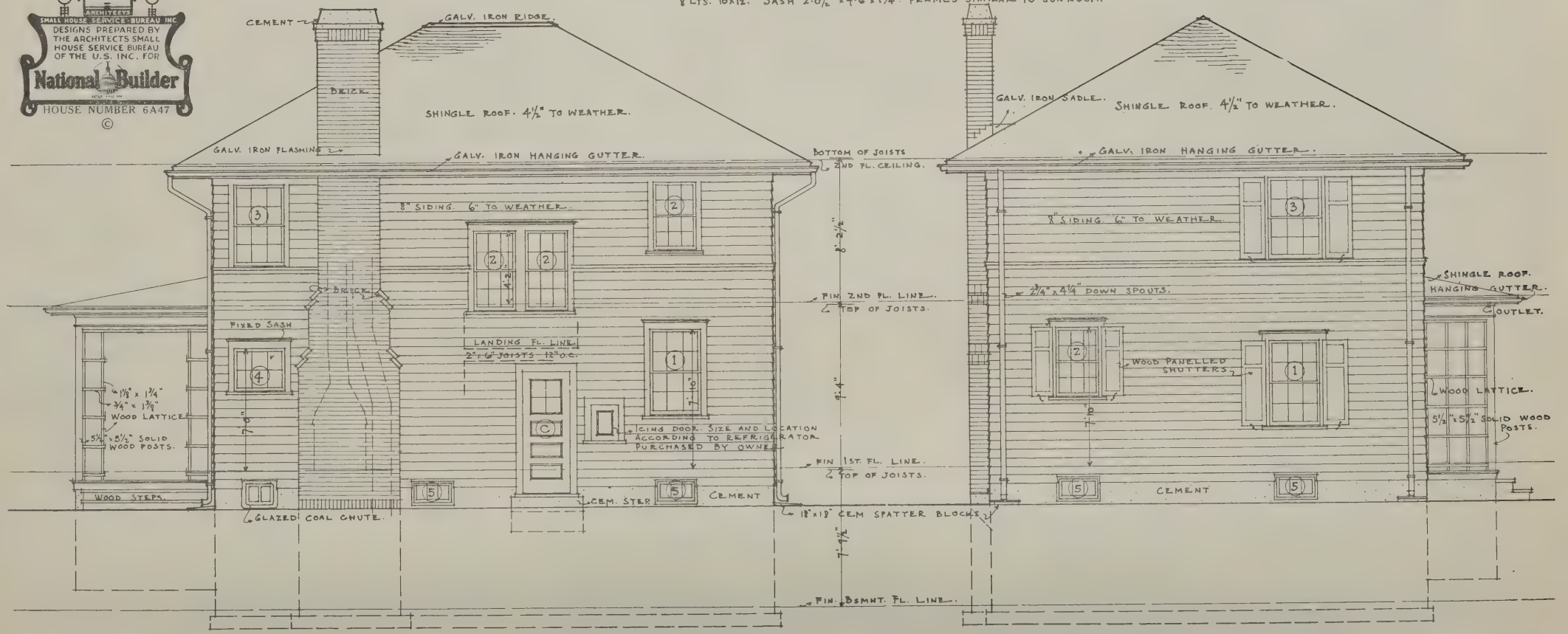
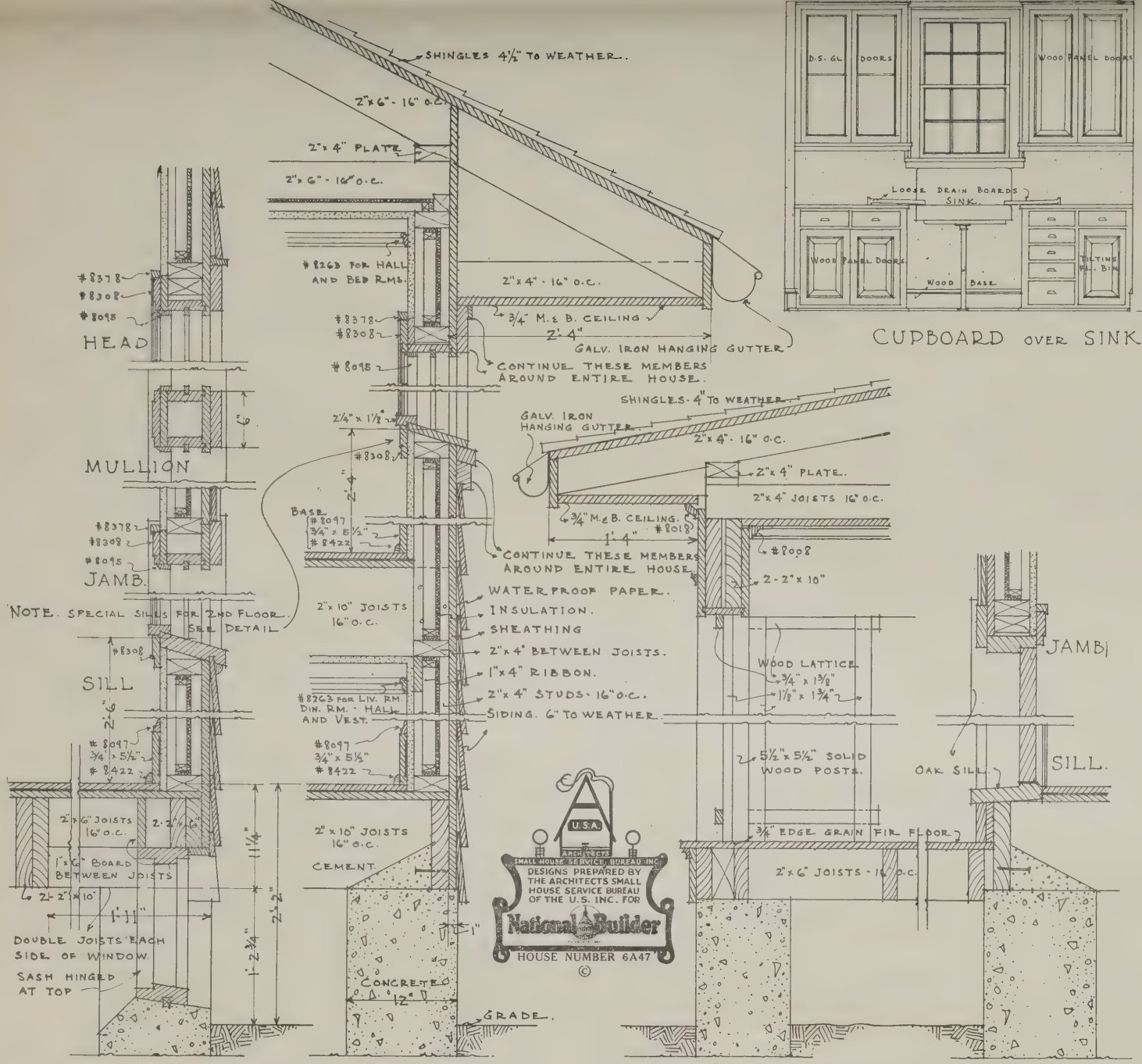


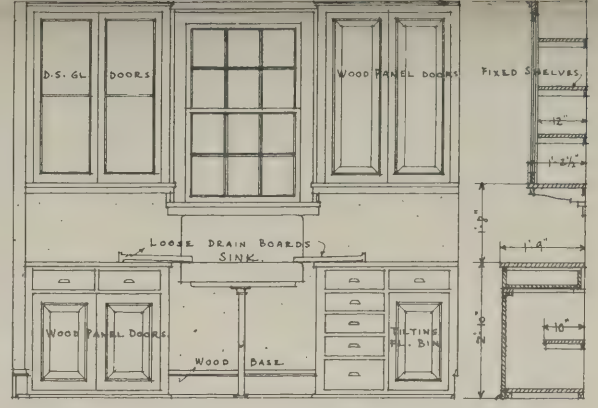
REAR ELEVATION.

SCALE ¼" = 1'-0"

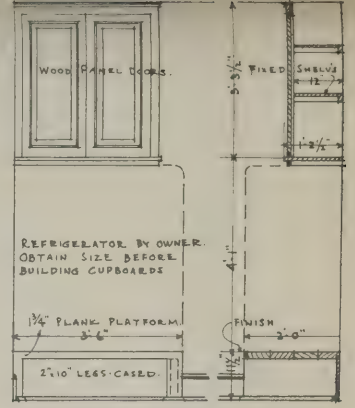
0 1 2 3 4 5 6 7 8

SIDE ELEVATION.



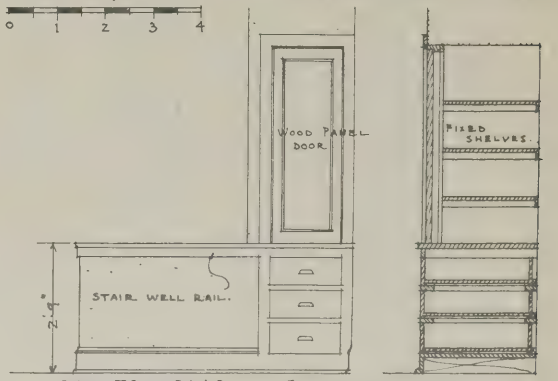


CUPBOARD over SINK.

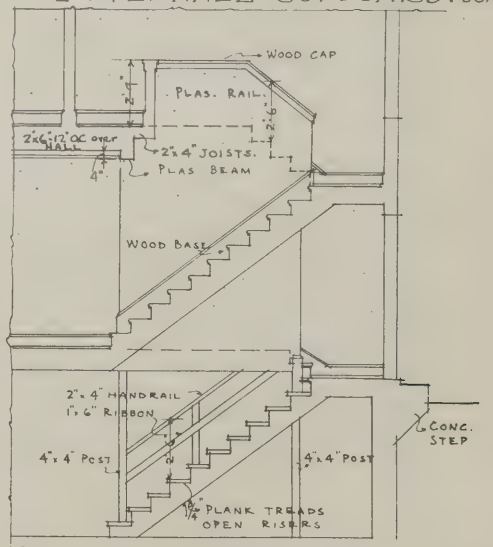


CUPBOARD over RFGR.,

SCALE ½"=1'-0"



2ND FL. HALL CUPBOARD. SCALE ½"=1'-0"



SECTION THRU STAIRS. SCALE ¼"=1'-0"

TYPICAL WINDOW--TYPICAL WALL. SCALE 1½"=1'-0"

SECTION THRU PORCH AND DOORS 'A' AND 'B'.

Paint as an Aid to Renting and Selling

By Albert Brace

INVESTIGATION has developed that practically all successful builders have made it a practice to give personal attention to the interior and exterior paint and varnish decoration of their projects. Aside from the functions of preservation, sanitation, light reflection and fire resistance, the variety of pleasing decorative effects possible through judicious selection and application of paint and varnish materials, exert a psychological influence on the prospective purchaser or renter of the very first importance.

In recognition of this fact, "National Builder" has arranged to publish through 1923 a series of articles which will treat the subject of paint with great thoroughness. In this issue Mr. Brace will deal with the general theory; in subsequent issues such specific subject will be covered in a practical way, as Hand Mixed White Lead and Oil versus Prepared Paint; The Uses of Color in Harmony and Contrast; Modern Treatments of Walls and Ceilings; Finishing of Floors and Woodwork; Painting Brick, Concrete, Metal and Cement; Kitchens, Bathrooms and Cellars; Model Decorative Schemes for Various Rooms, etc.

In addition to the above and in connection with each article, Mr. Brace will conduct a Paint and Varnish Question Box, in which he will be glad to answer questions and give advice on various problems as they relate to his general subject. Both questions and answers will be published in the first issue going to press following their receipt. Personal reply will be made in advance of publication when requested, provided return postage is included.

IN the valuable handbook recently issued by the International Association of Master House Painters and Decorators of the United States and Canada, four primary reasons are given for the use of paint:

"The first purpose served by paint is the protection of the surface from destruction by the natural elements—rain, snow, wind, sun, heat, cold and frost. Paint arrests decay of wood by sealing up the pores and keeping out moisture; paint protects metal by preventing the formation of rust (corrosion). Paint preserves brick and cement walls by keeping out moisture. If moisture should enter and freeze, the expansion would cause cracking and crumbling. This is what paint prevents.

"The second purpose served by paint is that of decorating a surface, to color it for the sake of beauty, to make a wall harmonize in color with other furnishings in a room, to make a surface radiate good cheer and happiness because of the influence color has on our nerves. Painting gives a uniform, even appearance to a surface by covering and hiding light and dark portions. Painting gives a surface an even gloss, a semi-gloss or a dead flat appearance, as wanted.

"The third purpose served by paint is that of sanitation. Paint possesses antiseptic, germ-killing properties. And further, it promotes sanitary, healthful homes by the thorough periodical cleanings given surfaces by painters in preparing for painting and decorating. Sanitation is also promoted by painting because a smooth, washable surface upon which germs do not so easily congregate is given by the painting.

"The fourth purpose served by paint is that of light reflection. Dark rooms are made lighter by painting. Light colored paints reflect and better distribute both artificial and day light. Making rooms lighter adds to the comfort, health and happiness in all homes, while reducing the cost of artificial lighting."

Surface Protection

For the builder who sells, interest in the first purpose of paint, that of *preservation* is measured by the degree of pride he feels in constructing projects that endure. He may feel that once the sale is consummated responsibility for the soundness of the paint protection is no longer his and argue that economy in this direction is therefore worth while. On the other hand a good name is the most precious thing in the world—how cultivate it better than to put such value into surface protection, both inside and out, that he can point with pride to other prospective purchasers rather than lead them through other streets as a matter of discretion. How much more satisfactory to hear the owner of a house sold a year or two ago utter words of praise then "Well, the rest of the place is all right, but you certainly stung me when it came to the painting and decorating." An out and out speculator might not mind it, but it is doubtful whether a thorough-going builder with a reputation to enhance would hear such a comment with any real pleasure.

The matter of paint preservation to the builder who rents is of course a matter of the most vital self interest. Repairs to a house are expensive—simply glance at today's prices on lumber, brick, cement and incidental labor. A news item vouches for the fact that plasterers in Philadelphia last fall received $25 a day and a number of the trade commuted from New York, arriving at 10 in the morning and departing at 4 in the afternoon. The war may be over so far as hostilities are concerned but on builder's materials and wage scales the Versailles Treaty failed to make any appreciable dent.

Let us suppose that in rushing a house to completion, the porch and steps were given a lick and a promise so far as paint was concerned. Inevitably rain falls and in time so much water seeps in that rotting gets in its deadly work and no lumber, however sound, can stand continued moldy dampness. In an astonishingly short length of time porch and steps will sag and perhaps break here and there so that finally a carpenter has to be called in. Compare his bill with the cost of a gallon of good porch paint properly and sufficiently applied in the beginning and you have the answer to the whole question of whether or not paint protection pays.

Coat a wooden surface with good paint and let it rain, snow, bake and freeze, the lumber will last indefinitely. Colonial frame houses built in New England as far back as the seventeenth and eighteenth centuries are in good condition today, sound in roof, foundation and siding, because painting was done regularly. Historic frame houses elsewhere are in a state of hopeless dilapidation because paint protection was delayed until it could do no good. The elements are always busy, man alone procrastinates.

As another sidelight on the preservative function of paint, an authority on real estate appraisals vouches for the estimate that a coat or two of good paint raises the value of a house as high as 25 per cent. And it is far less difficult to negotiate a bank loan on property well protected with paint than on property allowed to fall into deterioration through lack of it.

Paint and varnish are the natural guardians of property—"Save the Surface and you Save All."

To sell this thought (through the slogan) thousands of dollars are being spent annually by the paint manufacturers of the United States, alarmed at the prevalent tendency to look at paint purely from its decorative aspect. Millions and millions are spent on insurance in one form or another, yet hardly one person in a thousand thinks of paint as a variety of insurance. Yet such it is and a very important variety too.

Unprotected wood, metal, cement or brick must always yield in time to the slow, sure wearing away of wind and weather. Sun and rain, snow and cold eat at their vitals by day and by night. Protect a dwelling by every known insurance and if you leave out paint, in the end your premiums will be next to worthless. Paint alone, renewed when necessary, will save the structure, however, solidly and expensively built otherwise.

Viewed in this light, paint is an economy, just as good locks and a watch dog are economy in a neighborhood where burglary is rife. In one respect paint is more important than for instance fire insurance—it does not reimburse you after the damage is done, it prevents decay—which is really slow fire—before it starts. Moreover, fire insurance, though assuredly a wise precaution—a necessity even—does not add to the value of a building for purposes of sale or rental, whereas paint does and very appreciably.

Surface Decoration

The second purpose served by paint, that of *decoration* is, as has been said, the one most familiar to the general run of us. It is for this reason of very decided importance to the builder, regardless of whether he may rent or sell. In certain essential aspects his wares differ very little from those of a retail merchant; he must "dress" that which he would sell to give it the strongest possible appeal. Few things facilitate his course in this respect as paint, exerting as it does the strongest kind of psychological effect on the prospect's mind. But let us illustrate with a story.

A real estate friend of mine in a Midwestern city, attracted by an unusual bargain in boom times, purchased a block of houses with a view of renting them for his own account, a departure from a life-long policy of acting as broker only. Being decidedly bargains, they were naturally not in the best of repair—in fact to all of them the term 'unkempt' might not unreasonably have been applied. Housing, however, was scarce and being anxious to realize on the transaction without delay he proceeded to invest in certain essential repairs. As is apt to be the case with "bargains" he was soon horrified at the extent of work necessary on heating, plumbing, lighting, etc., and once these were out of the way, he clamped down rigidly on appropriations and with the barest attention to yards and fences, placed the houses forthwith on the market.

People came, eagerly, and the desirables who came inside listened to the wonders of furnace, hot water system, wall fixtures and so forth, looked around at floors, walls and ceilings—and passed on their way. My friend was dumbfounded. One day he sauntered dejectedly past his acquisitions and a snatch of conversation drifted to his ears from a car parked at the curb. "Did you ever in your life see anything so shabby?" a woman's voice queried, and the prosperous looking sedan rolled off, leaving the broker looking at the houses, and the dingy, peeling, half-painted houses gazing dumbly and reproachfully back at him. A moment or two of thought and he jumped into his car; dismounting at the bank he closeted himself for a half hour there and emerging, sped to the nearest painting contractor. Another half hour there and the following week scaffolding garnished the exteriors while drop cloths filled the insides. In a fortnight the neighborhood gasped: The same houses—impossible! But let's end the story. By the first of the month moving vans had emptied their contents into every single house with leases signed at a figure actually a third more than that previously asked—and signed gladly.

"What's the moral?" queried I when my friend told me of his experience. "Paint did it," was his reply. "I forgot its importance, especially with the women. A run down exterior, whether it's an automobile or a house ends it for them. The husbands all examined the heating plants but their "bosses" looked at floors, the walls and the peeling paint outside. To please them—and rent—cost me over 500 cool dollars but the advance I'm getting over the old rentals will pay off the note and interest at the bank within four or five months.

What the broker voiced was merely a fragment of the psychology of paint. It's a wonderful thing and all the thoughts on it would fill a hundred pages. The point so far as the broker is concerned is that the two factors which chiefly determine the selling or rental value of his projects are: First, the appearance, and, second, the physical soundness of their internal economy. Assuming both are up to snuff, the first makes them *stop*, the second makes them *clinch;* obviously the primary consideration is to make them stop and proper attention to paint work can effect this essential as probably no other medium.

Let's take another illustration. Fifth Avenue haberdashers of the exclusive type take a single tie, fold it, drape it with infinite care and place it in a velvet trimmed, specially-lighted window—alone. Price inside, $5! Take the same tie, add to it eleven others like it, throw them on a counter with a hundred other patterns in a down-town department store and people will pass them by at $1.49.

So with houses. Paint a row of them with one coat of a uniform cheap gray paint and people may rent them grudgingly at $50 a month. Paint one of them white, two coats, with Dutch Blue shutters and trim and dozens of good citizens will tumble over themselves to pay $75—$100 if the others were white and blue too. It all comes back to the same thing and while paint is not the sole consideration, it does frequently affect the decision as to whether or not further inspection is worth while.

No small part of the psychology of paint is bound up in the normal feeling of pride we like to feel in our surroundings. With the exception of the shiftless (who do not make good tenants) people in general will not risk the stigma that attaches to living in a dingy house, even to affect a greater or less saving on the lease. All over this broad land of ours the home and its appearance are considered the local gauge of the inhabitant's prosperity; as a nation we do not go in for picturesque ruins. The interior of a home may be a model of neatness and perfection of detail but the world at large sees only the exterior—let it run down and the credit and repute of the occupant go down in proportion. And the better painted the neighboring houses the more fatal the contrast to the neglected one.

So true is this that if one man in a block paints his house, sooner or later the others will follow suit—they simply cannot afford not to and it is well that it is so. Pride may be the impelling motive but the results are substantial. Values increase, needless and perhaps costly repairs are saved, the tone of the neighborhood goes up and the entire street benefits, many of those living on it scarcely knowing why or how. In its tiny way, a contribution has been made to the sum of the nation's great wealth.

Nos is all this question of appealing to people's interest through paint decoration an exhorbitantly costly item for the builder. Ingenuity will do the work and save him money without sacrificing a tithe from the quality of endurance and soundness. How this may be done will be covered in succeeding articles in considerable detail.

Paint Sanitation

Here is a field in which the importance of paint has only been appreciated within the last 30 years or so. While all paint and varnish in reasonably good condition is septic and hostile to germ life, some are more so than others. Exterior finishes are of course not a vital consideration in this respect, but for the interiors comparison lies first between wall finishes in general and wallpaper, then between the different types of wall paints themselves.

There is little or no argument as to the relative sanitary merits of paint and wall paper, since the former (except calcimine) can be washed whereas the latter cannot. The paste rots beneath the paper and the seams are exceedingly hospitable to all sorts of virulent germ life, constituting an active breeding place for almost every variety of bacteria. In an authoritative booklet by Mr. G. B. Heckel, it is stated that "paint

exposed under the same conditions, side by side with wall paper, remains comparatively free from bacteria, while the wall paper swarms with them. Bacteria are the causes of infectious diseases such as diphtheria, scarlet fever, typhoid fever, grippe and common colds."

Of the oil paints gloss enamel is usually considered the most sanitary treatment for walls and woodwork, usually white because it shows dirt most readily and for psychological reasons. However, because of its monotonous glare its use is generally confined to bathrooms and kitchens; semi-gloss enamel, tinted to harmonious shades is most desirable for living, dining and bedrooms. Both gloss and semi-gloss (or eggshell) enamel may be frequently washed without marring the lustre or injuring the color and cover better than lead and oil.

Next to enamel as a sanitary wall treatment comes flat wall paint, a special product given a dull sheen usually through the use of lithopone as pigment and tung oil as a vehicle. Made ready for use in varieties of restful tints, flat wall finishes are rapidly increasing in popularity. They are more porous in nature than enamel but are softer in tone and less expensive. The better grades may be washed without injury, are very durable and may be applied impartially over canvas, plaster, burlap, wood, metal or wallboard. Many wallboards come ready primed for flat wall paint or enamel, thus eliminating the necessity for much preparatory work on the part of the painter.

The main feature of calcimine is the saving of time in labor and expense in material. It comes in dry form and is prepared for use by mixing with hot or cold water—for this reason it is not washable as are flat wall paints and enamel. The best calcimine however contains an efficient germicide and into none of them enters anything that is not healthful. As the modern trend is toward plain tones on interior walls, calcimine being both cheap and in good taste is constantly growing in favor. A great variety of tints is available and extremely pleasing combinations are possible with them, especially for living and sleeping rooms and halls. Ordinary paste white lead is sometimes combined with so-called "flatting oil" to give a semi-gloss effect for walls and woodwork, but while less expensive it does not give as smooth and permanent an effect as enamel, nor is it as dull and restful to the eye as flat wall paint. It has to be tinted by hand and much more time is thus required than thru the use of goods ready made in packages such as enamel, flat wall paint and calcimine.

Light Reflection

This fourth function of paint, that of light *reflection,* is of distinct importance to the builder in that aside from enabling him to make a dark room lighter and soften possible glare in a naturally light room, it also involves the use of materials varying in light reflective qualities to make them look larger or smaller as desired.

In what are now known as the "awful eighties" the tendency in interior decoration was all toward sombre wall colors in rooms crowded with bric-a-brac. Today we seem to have reached the end of the pendulum's reactionary swing—the modern home calls for light and yet more light. Ornate wall papers deep in ground color have been succeeded by plain colors of such neutral hues as grays, putty, Lemont Stone, creams and ivories. For a while it looked as though every home were to be "hospitalized," when white gloss or semi-gloss enamel, now confined to kitchens and baths, appeared to have gained supremacy.

Now, however, more attention is paid to the size and natural lighting of the room. If it naturally receives much sunlight, the effect is neutralized by tones and blends of light and dark gray, green and blue—the former being safest where bright hangings and upholstery predominate. In rooms requiring more light, creams, yellows and even white are the proper treatment.

In accordance with nature's scheme, a room should be tinted from light at the top (ceilings) to darker tones at the bottom (floors). If a room be small, yellow, pale blue and green give the impression of distance and push out the walls. On the other hand large rooms may be pulled together and given a cozy tone with wall tints of buff, tan, turquoise blue, sage green, etc. Much of course depends on the type of room: Living, sleeping, dining, nursery and so forth, and the relative color and light reflective requirements of these rooms will be taken up in later requirements.

Even cellars, formerly regarded as Calcutta holes, to be visited (when necessary), with overalls, gloves and a flashlight are now being given red or green tile floors and a wall treatment of cement paint in white, light grey or green—in some cases even of mill white in order to make them part and parcel of the modern feeling against gloom. The standard of home decoration, now demanding parquet floors and white tiled baths and kitchens may soon come to exact period basements with Italian Renaissance laundries and Tudor furnaces. Certainly the manufacturers of some of the accessories are pushing the national taste toward them.

Paint a Fire Retardant

Yet one important use for paint, hitherto not mentioned, remains: Contrary to general belief, paint, not when stored in open cans but applied to bare wood does not add to its natural inflammability. On the contrary it makes lumber more resistant to fire and on shingle roofs its use is decidedly desirable where the paint in question contains over 54 per cent of non-combustible pigment. This is the least content of prepared paints in general and their application results in giving the shingle a semi-metallic film that renders smooth the fuzzy surface of the wood and prevents the warping that creates pockets in which dangerous cinders blown by the wind might ignite.

To make precaution doubly cautious, some builders use a solution on wood prior to painting or varnishing. It consists of a solution of sodium fluoride in water, about six ounces to the gallon. Sodium fluoride is not only fire resistant but has the advantage of exerting no injurious effects on the coats of paint or varnish which may later be applied over it.

Paint and Varnish Question Box

Q.—Can you tell me whether or not calcimine is capable of being stippled for wall effects as is done with flat wall paints?

A.—It is possible but requires the services of two men. Calcimine dries so fast that the second workman must stipple as soon as the brush stroke has been completed; it is impossible to go back over work once it has "set."

Effect of White Ants

L. & C., Topeka, Kan., writes: "Last summer we built a residence. The dining-room and living-room were finished in plain white oak, which, after being applied, was filled, shellaced, and varnished. After the party had lived in the house for about three months, they noticed a little dust on their dining room table. Upon investigation they found that in one of the ceiling beams there were two or three little pin holes newly made. The following day there were two more and new ones appeared every day, until in a space three feet long there are from 60 to 75 pin holes. The last few days the same pin holes began to show up in other places of the room. It is evident there is some little worm or insect in the wood and what puzzles us is how to get rid of them without removing and renewing all the finish. Any suggestions that you may offer will be highly appreciated."

A.—Your trouble is caused by white ants boring from within the wood. They come from Mexico either in the wood itself or separately. There is no remedy in your case, but to strip off the finish and apply solvent naphtha baths each week for two or three weeks, using as a matter of convenience, a spraying apparatus such as is used for popular disinfectants. A common remedy is also creosote, but this would render the room, and perhaps the entire house unlivable. The solvent naphtha is fatal to the ants and should penetrate some depth into the wood. These white ants rarely come to the surface, as is well known in India where they are particularly prevalent. In fact, furniture shipped there from England is first given a treatment of sugar and water solution before the finishing operation. In India these ants have been known to bore from the ground into an entire house in such quantities and so invisibly that the house crumbled without any external evidence of their ravages.

Rat Proofing Grain Storage Buildings

The "Reason Why" Facts Here Presented Furnish the Rural Builder With Arguments to Show How Adequate Buildings Are Investments and Not Expenses and Thus Create More Business for Himself

By F. C. Lewis, Rural Architect and Agricultural Engineer

WHAT is to be the profit for a farmer to grow large crops of grains if they be lost through inefficient storage?

After the crops have been given well prepared seed beds, good culture and proper weather conditions for maturing and harvesting, there are yet many enemies which seek to decrease the marketable quantity which has been produced.

The enemies which affect the stored grains are weather and rodents. The rodents are found on every farm. The preservation of stored grains is important to every farmer, whether living in the corn belt, in the wheat belt, or in a general farming section of the country. Millions of bushels of grains are destroyed or rendered unmarketable by rats and weather conditions each year. A farmer has no control of the weather; he has no control over seasons, but he can fortify himself against the crop losses which occur as a consequence of inadequate equipment and inefficient shelters. When grains were cheap any sort of a makeshift crib or granary was sufficient to storing grains. In dollars and cents, many farmers reckoned they could stand a loss of a few bushels of grain better than they could afford the cash outlay for the construction of a proper storage building. The high prices of labor and of grains has defeated this out-of-date theory.

Those contemplating the erection of new or the remodeling of old buildings, whether of frame, brick, stone, concrete or tile, should consider the sanitary and economical benefits to be derived from rat-proofing measures. The expense incurred is slight when compared with the cost of the building and the saving of grains.

Fig. 1—A rat-proofed crib and granary of frame construction and concrete foundation and floors. The galvanized iron strips prevent the rats from crawling up the siding and gnawing through the siding above the wire

Proper storage of grains demand weather and rodent proof buildings. Good, well equipped storage buildings mean profit and satisfaction for the farmer. A good grain storage building will pay for itself in a few years through its saving of labor in handling grains and from destruction of grains housed in it. Advantages may also be taken of the peaks in prices at different periods of the year by storing grains.

For the successful elimination of rats they must be separated from their feed supply during the grain storage periods of the year. This can only be done by some form of rat-proofing of the storage buildings. The old method of placing grain storage buildings upon posts with inverted

pans at their tops often fails to exclude rats, because the posts are not high enough to place the openings above the reach of the storage of grains, such as shelled corn, wheat, oats, etc., require tight walls and a much stronger and better braced structure than do cribs. As a rule, grain storage buildings are not sufficiently braced to support the great pressure of the grains, con-

Fig. 2—Framing for the crib and granary illustrated by Fig. 1. The hardware wire-cloth is put between the studdings and the siding. The frame is well braced to prevent bulging under the grain pressure. The siding for the cribs is bevel-edged to keep out rain and also allow for ventilation

the animals. The posts should be at least three feet high; such a height would give an unsightly appearance.

Rats do not gnaw plane surfaces of wood; they attack corners around doors and openings, between siding boards and places where they can get teeth holds. One of the best and cheapest methods of excluding rats from grain storage buildings is to cover all wooden openings, and cracks with hardware wire-cloth to a height above the reach of rats. The foundation should be of masonry extending below the surface of the soil, to prevent burrowing animals from getting through under the floor. A concrete floor, if constructed upon a porous base, such as cinders or gravel, and having a rich cement mortar top coat, will not affect the keeping qualities of the grain if the side walls and roof are rain tight.

If a permanent frame grain-storage building is desired, a concrete foundation and floor should be used. If the building is to be temporary, or a wood floor is used, it may be built on piers, or may be rat-proofed by using hardware wire-cloth between the floor joists and the flooring and between the studding and siding, leaving an air space between the floor and the earth for ventilation and protection of the flooring from moisture.

Cribs are used for the storage of ear corn, and do not require tight walls. The siding is usually put on with spaces between the boards for ventilation. Granaries for

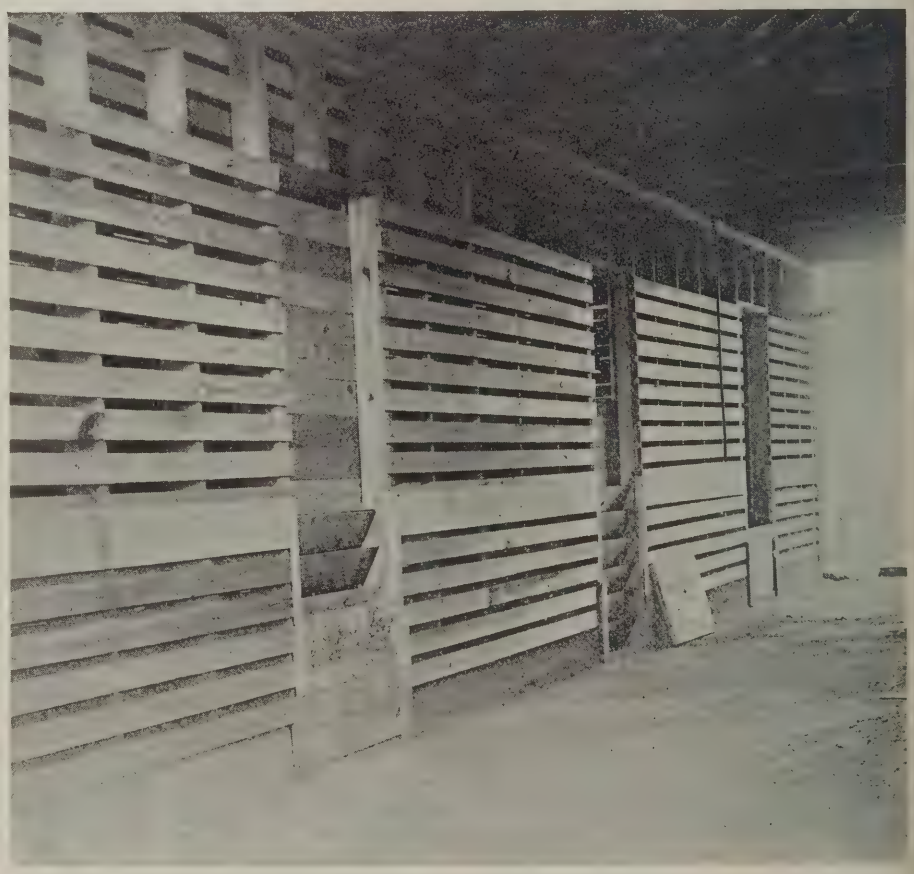


Fig. 3—Interior view of the crib wall construction. The siding above the doorways is put on the inside of the studdings and is made removable. The door openings are fitted with slip-boards for convenience in filling and emptying the cribs. Girders of 2x6-in. material across the driveway tie the walls together

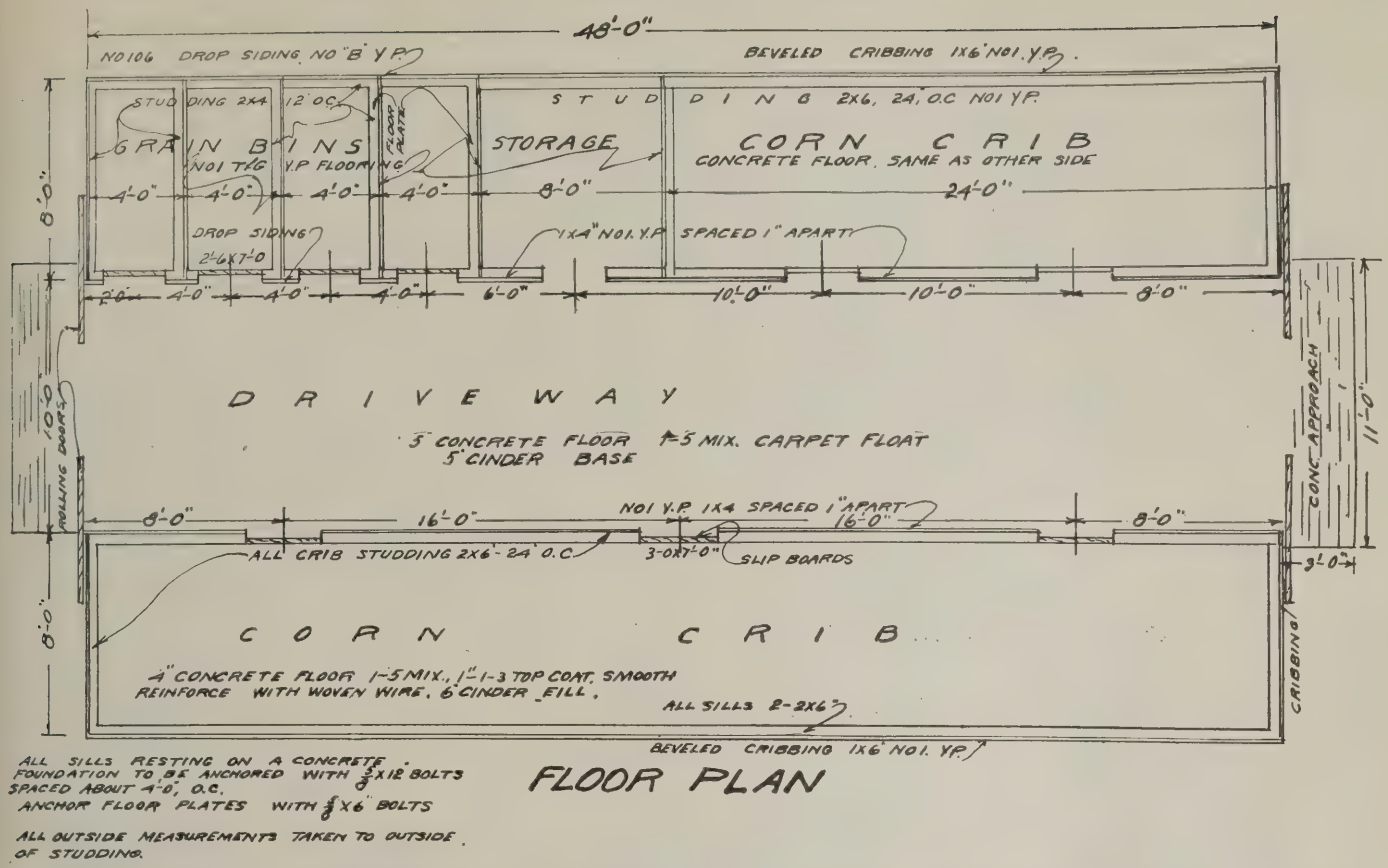

48'-0"
NO 106 DROP SIDING NO "B" Y.P.
BEVELED CRIBBING 1X6 NO1. Y.P.
STUDDING 2X4 12" O.C.
FLOOR PLATE
STUDDING 2X6, 24" O.C NO1 Y.P.
GRAIN BINS
NO1 T&G Y.P FLOORING
STORAGE
CORN CRIB
CONCRETE FLOOR, SAME AS OTHER SIDE
4'-0" 4'-0" 4'-0" 4'-0" 8'-0" 24'-0"
DROP SIDING 2'-6"X7'-0"
1X4" NO1. Y.P SPACED 1" APART
2'-0" 4'-0" 4'-0" 4'-0" 6'-0" 10'-0" 10'-0" 8'-0"
8'-0"
10'-0"
ROLLING DOORS
DRIVEWAY
5" CONCRETE FLOOR 1-3 MIX. CARPET FLOAT
5" CINDER BASE
CONC. APPROACH
11'-0"
3'-0"
8'-0" 16'-0" NO1 Y.P 1X4 SPACED 1" APART 16'-0" 8'-0"
ALL CRIB STUDDING 2X6-24" O.C
3-0X7'-0" SLIP BOARDS
CORN CRIB
4" CONCRETE FLOOR 1-5 MIX., 1" 1-3 TOP COAT, SMOOTH
REINFORCE WITH WOVEN WIRE. 6" CINDER FILL.
ALL SILLS 2-2X6"
CRIBBING
BEVELED CRIBBING 1X6 NO1. Y.P.
ALL SILLS RESTING ON A CONCRETE FOUNDATION TO BE ANCHORED WITH 5/8X12 BOLTS SPACED ABOUT 4'-0" O.C.
ANCHOR FLOOR PLATES WITH 5/8X6" BOLTS
ALL OUTSIDE MEASUREMENTS TAKEN TO OUTSIDE OF STUDDING.
FLOOR PLAN

Fig. 4—Floor plan of the crib and granary. The arrangement of the cribs and granaries are clearly shown. Concrete floors and approaches are used

sequently the walls give away or bulge when the bins are filled.

The crib and granary, illustrated, was designed and built by the author and shows clearly one of the best examples of rat-proofing a frame building. This building is 26 feet wide and 48 feet long. There is a central driveway having a crib eight feet wide on one side and a crib 24 feet long, four bins four feet long and a storage room eight feet long, all eight feet wide, on the other side. The whole building is covered with a gable roof. The capacity of the building is about 1,500 bushels of ear corn and about 900 bushels of grains.

The building is supported by a concrete foundation eight inches wide, extending to a footing 18 inches wide, nine inches thick, two feet below the surface of the soil. Concrete floors four inches thick and having a one inch smooth top coating, placed upon a six inch, well soaked and tamped cinder fill, is used for the cribs and bins. A concrete floor five inches thick, with no top coating, placed upon a five inch cinder fill, is used for the driveway. The crib and bin floors are reinforced with woven wire fencing. The foundation wall extends eight inches above the surface of the floors and 18 inches above the surface of the soil.

The plates are of 2x6 inch planks and 1x6 inch boards anchored to the concrete foundation by 5/8x12 inch belts. The 1x6 inch boards are nailed to the ends of the studdings and nailed to the plank sill. Both the 2x6 and the 1x6 sills are belted to the foundation. The studdings are also nailed with spikes to the sills. This anchors the side walls firmly to the foundation to pre-

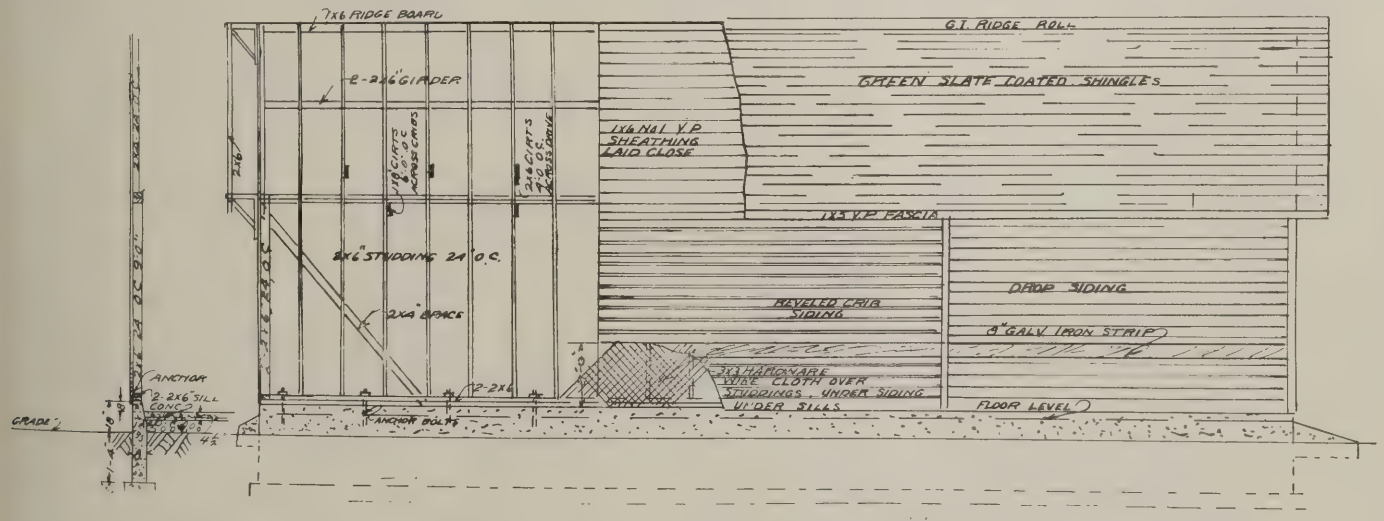


Fig. 5—Working plans for the side elevation of crib and granary. The frame work is anchored to the concrete foundation to prevent the walls from spreading or the building from being slipped off the foundation by heavy winds while empty

vent the walls from spreading under the pressure of the grains. The studdings for the cribs are 2x6 inch material 24 inches on centers. For the bins the studdings are 2x4 inch material 12 inches on centers. All studdings are nine feet long and supported at their tops by two 2x6 inch plates. The plates are corner braced by 2x6 inch pieces spiked to them. The end walls are cross-braced and the side walls braced at their ends by 2x4 inch pieces spiked to the backs of the studdings. Girders of 2x6 inch material, bolted to the plates, extend across the cribs, spaced about ten feet apart. The cribs are also braced from studding to studding by 1x10 inch pieces every six feet to prevent bulging of the walls. The floor plates for the bin partitions are 2x4 inch pieces bolted to the concrete floor and support the 2x4 wall studdings which are spaced one foot apart on centers.

The outer crib walls consist of 1x6 inch boards with their edges beveled at angles of 45 degrees and spaced one inch apart, the beveled edges allow for a free circulation of air and also aid in keeping out rain. The siding for the bins is one of the common patterns of drop-siding. Drop-siding is also used for the gables. The inside crib siding is 1x4 inch material spaced one and three-fourths inches apart. For seven feet high the siding is nailed to the outside of the studdings. Above this it is made removable by boring holes through the boards and hanging them on spikes driven into the studdings. These top boards may be removed for convenience in filling and put into place as the filling progresses.

The rafters are of 2x4 inch material, spaced two feet apart on centers and strengthened by a purlin plate supported on posts resting on the crib walls along the driveway. The sheathing is 1x6 inch boards laid tight and covered with slate covered shingles. Verge boards of 2x6 inch material, supported by brackets in the gables, carry a two foot overhang of the roof.

The rat-proofing consists of stapling 3x3 hardware wire-cloth 30 inches wide to the outside of the studdings and sills under all siding. Near the top of the wire, galvanized iron strips eight inches wide are nailed to the outside of the siding; this prevents the rats from crawling up the siding and gnawing through the walls above the wire.

The door openings are fitted with slip boards held into place by cleats. These hold the grain and allow the corn to be taken from the bottom of the cribs while full. These boards are put in as the filling progresses. The door openings are made rat-proof by fitting into slots solid wood doors about 28 inches high having wire cloth on the back side and along the edges and a galvanized iron strip along the top. These doors may be left in place when the cribs are partly empty. The edges of the openings are covered with galvanized iron to prevent rats from crawling up the wall and across over the doors. The bins are equipped in the same manner with the exception that the slip boards are all perpendicular. Any farm building should be kept well painted. It not only adds to its appearance but reduces the upkeep and preserves the lumber.

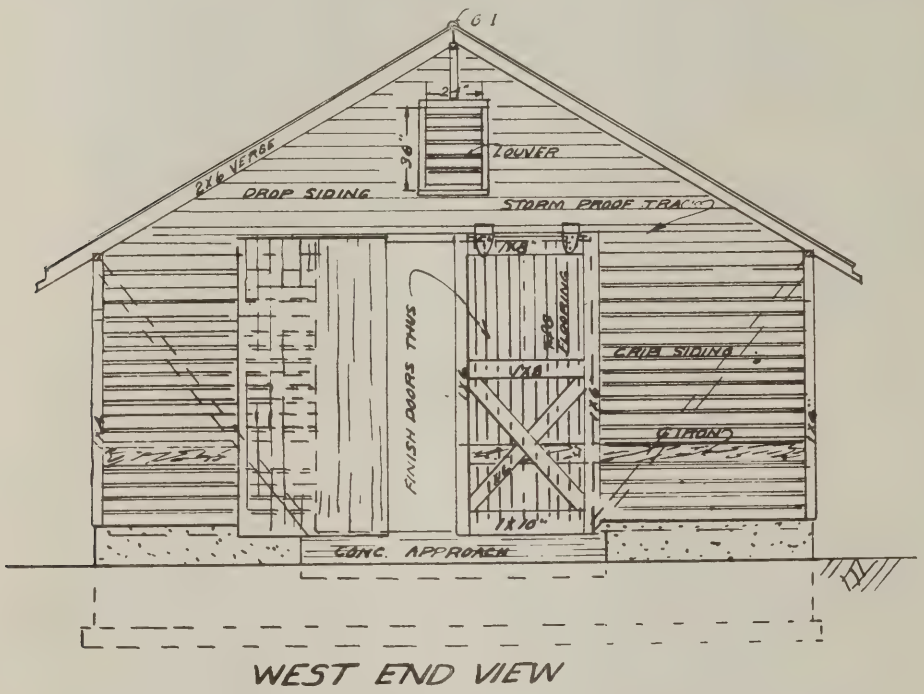


Fig. 6—Working plans for the end elevation of the building. The driveway is enclosed by double rolling doors. The approaches slope inside of the doors to prevent rain from driving in under the doors. Louvers are placed in the gables to allow a free circulation of air over the grain to dry it out and prevent molding. The inside of the louvers are covered with wire netting to keep out sparrows

Standardizing Dwelling Houses in Sweden

CONSUL GENERAL D. I. MURPHY, Stockholm, Sweden, reports that in various sections of Sweden during the past few years standardized dwellings have become popular. The main features are mass production of parts on factory scale and economy of material. It is said that these houses compare favorably with wooden houses built according to the old and tried methods. One company plans and builds standard dwelling houses, separate and in blocks, as well as entire residential sections where people of small means may reside. They also build necessary roads, conduits, etc. The company undertakes to make investigations into projected improvements, to prepare plans for the same, and to supervise the work of construction as well as to supply suitable interior furnishings for the houses they build. Other concerns in this business confine their activities to the simple construction of standard houses for working people. The names of concerns mentioned above, as well as plans of small frame houses and pamphlets from one of these companies may be examined upon application for file No. 74817 to the lumber division of the Bureau of Foreign and Domestic Commerce, Washington, D. C.

Brazilian Government Dwellings

THE vice-consul at Rio de Janeiro, Jack D. Hickerson, reports that a contract was signed in Rio de Janeiro on October 16, 1922, by the prefecture for the construction of dwellings for government employees and laborers, the work to begin immediately. The firm is given the right to expropriate property necessary for the fulfillment of its contract, and is exempt from payment of municipal and federal taxes in connection with the construction of the houses. The houses, not to exceed 5,000 in number and 10,000 milreis (about $1,400 at the present rate of exchange), are to be divided into two series of eight types of construction each. The first series will be sold to Government employees and laborers at prices which vary with the types of construction. The purchasers are to have liberal terms of payment, extending over 15 years, with a maximum interest charge of 6 per cent. Of the second series, only the first, second, and fifth types will be sold, under similar terms as in the first series, and the remaining types will be rented to laborers or Government employees, the rent not to exceed 15 per cent of the capital invested. As it is possible that the contractors will be in the market for construction materials, the name of the firm holding the contract may be obtained from the lumber division of the Bureau of Foreign and Domestic Commerce, Washington, D. C.

Questions, Answers, Kinks and Discussions

Edited by V. L. Sherman

Herein is a Department of Mutual Help for the Exchange of Experiences and Ideas. It is Not Only Well Worth Your While to Give Your Experiences for What You Get Back from Others, but National Builder Pays You for Doing So in Good Hard Cash

The Wonder of Words

The following is an extract from *"Pillar to Post"* and is said to be the inspired writings of a local ad writer, *Allons:*

"Men and women never so fully realize their oneness with life and the natural Law of Perpetual Progress as when their best efforts are directed toward the creation of a home and family. To build the *Mandel* for a home, and to make that home vibrate with joy and love, is to join the front ranks for permanent advancement.

"If those who occupy homes of the Tilmont design are not happy it is because they have violated some natural law.

"Out of the homes of the Chesterfield design walk men of victorious bearing whose voice, manner and expression inspire confidence and trust. Such homes are, as a rule, owned by men of quick decision, keen perceptive faculties and indomitable wills."

"Dignified yet different," Harry Leon Wilson might say.

Two Gages

Fig. 1 is a sketch of an adjustable centering gage submitted by B. W. C., of Everett, Mass. He writes: "The sketch explains itself. It is made of hardwood, two pieces, 3/8x3/8x6 in., and three pieces, 1/4x3/8x2½ in. The short pieces are drilled in the center about 3/16 in. from either end with a drill slightly larger than the screw to be used, so that it will work freely. I use a 5/8-in. No. 4, round head screw. In the exact center, between the two side pieces in the center bar, a small wire brad is driven and is filed off sharp to make a line which, if the article is made neat and correct, will always be in the center of the stock used, no matter what the thickness is. This gage will work on stock up to 1¾ in. thick.

"When boring holes that require to be of the same depth first bore a hole with the auger through a round piece of wood, lengthwise. Slip this over the auger next to the bit-stock, first cutting it the desired length so that the part of the auger projecting beyond the wooden gage will be the same as the depth of the required hole."

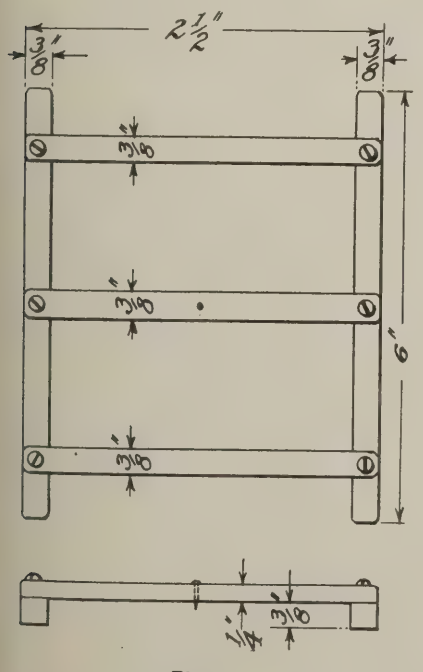


Fig. 1

Wrong and Right

There are times when questions put may be answered in no way to escape argument. But since argument and suggestion is very wholesome we hope that the readers will continue to send in their differences of opinion quite freely. Such differences are surely worth while. At one time the question arose as to whether the thick or the thin nut of a lock nut combination should be placed outside. The first said that since the thin nut was in reality the locking nut it should first be brought down on the bolt until it bit. Then the thick nut, the one which actually held, should be turned down to the thin one and the latter backed sufficiently to lock the nuts. Correct in theory. Then came the shop man. His reply was that if such were the case in the general run, some husky mechanic, who was not well versed in theory, would twine the thin nut down and then wrench it so hard that the threads would be a total loss, whereas if the thick nut went down first it might be able to stand the strain and the mechanic would not be so particular about the tightness of the following thin one. Both correct.

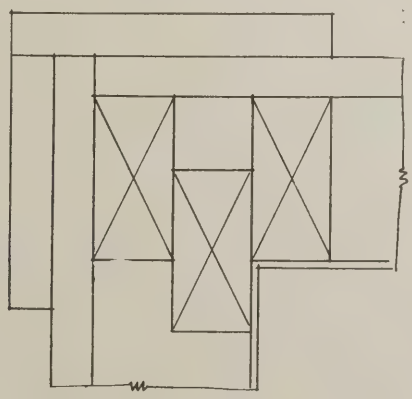


Fig. 2

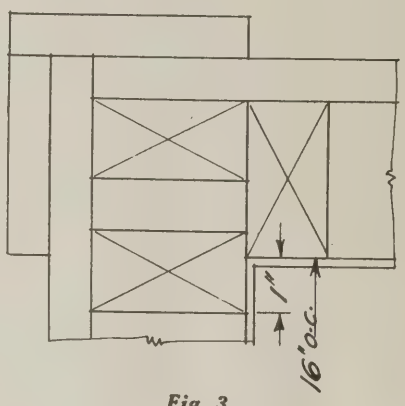


Fig. 3

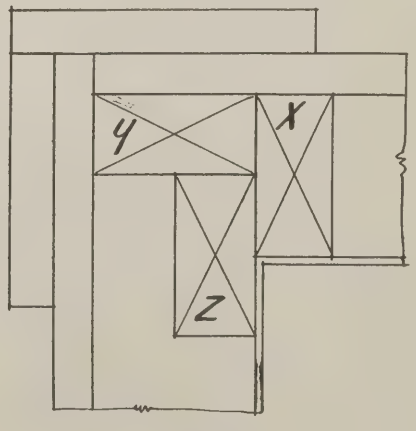


Fig. 4

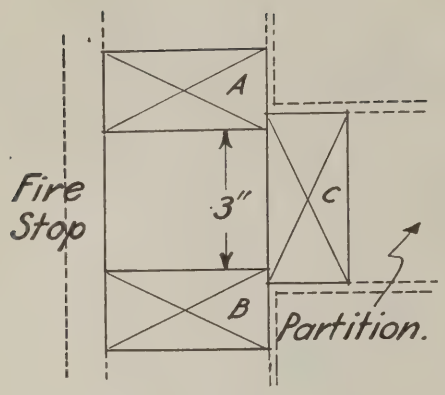


Fig. 5

In the NATIONAL BUILDER for December, E. R. S. presented a sketch of a house corner which aimed to reduce the work of the lather. An extra 2x4 was left to be placed by the lather against the corner when he was ready.

We present herewith three more corner constructions with a similar aim. Fig. 2 is endorsed by F. M., of Michigamme, Mich.; J. R. B., of Yonkers, N. Y., and B. W. C., of Everett, Mass.

Fig. 3 is submitted by F. D., of Manitowoc, Wis., and Fig. 4 by L. L. M., of Seattle, Wash. The last named has supplemented his sketch with another, Fig. 5, of which he says: "I also include my method of tying in partitions, which I find to be a great time-saver as well as adding strength to the corners.

"Studs A and B are raised with the wall in which they are placed and stud C is raised with the partition, and spiked into place, both into studs A and B and fire-stop. I find this much easier than nailing a board to the back of stud C, and it requires but little more material. Above all it makes a much better corner and helps to eliminate plaster cracks. Also, as both plates are laid out at the same time the wall will be plumbed automatically without the waste of time required by the other method."

The Sun Dial

An inquiry comes from T. M. on the sun dial. It seems rather good to have such a question come in. It speaks of more leisurely building, and a personal element in the grounds of a home. As one writer says, it reminds of the time when ordinary folks retired with the sun, and worked from sun-up. There is not a better touch to a garden than a sun dial and it need only be made with care to answer the purpose of a time-piece very well. The original sun dials were shadowed by a vertical reed. That was in the days when the world was a "village that voted the earth was flat". But on further consideration they found the acceptance of the spherical theory and the reckoning of latitude had a distinct advantage when applied to the sun dial.

The sun dial is usually a level plate graduated with lines which are derived from the triangle A B C, Fig. 6, of which the angle A B C is equal to the angle of latitude of the place. The instrument is located by means of a sight on the pole star, and reads to sun time only. If you want to be very exact you can say that the sun dial is correct three or four days in the year if the sun is at the meridian at noon. However, since no extreme accuracy can be brought to bear on such a relatively small plat, the sun dial if properly made will doubtless be more accurate than the average clock and less off than the average watch.

Mark and extend the line A B through the plate. From the center B draw the line B C, making the angle A B C equal to the angle of latitude for your station. From

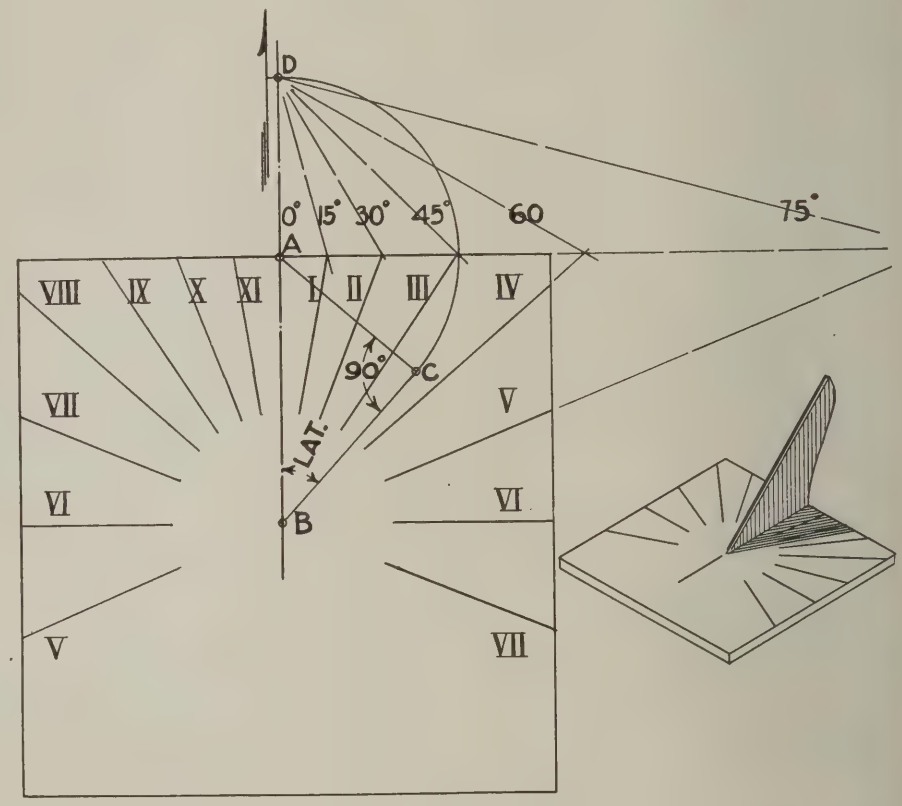


Fig. 6

the point A draw a line which will strike the line B C at right angles. With a compass swing the length A C around until it crosses the first line at D. Now reckon the line D A as zero degrees and lay off, to the right, angles at 15, 30, 45, 60 and 75 degrees and produce them until they hit the upper edge of the plate. At these points run lines into the center B and you have the noon, one, two, three, four, five and six o'clock hour marks. Invert and reverse the marks and you have all of the marks on the dial.

The upper edge of the gnomon, or dial pin, should have a fairly fine edge and should enter the plate precisely at the center. Also it should extend beyond the plate about one-quarter its length. The whole should be made of some weatherproof material. Somewhere around the writer has the pattern for a dial plate and a style for 41 degrees latitude. He thinks he has some blue-prints of the same thing and would be glad to furnish any interested subscriber with a print or brass casting if they have use for it.

To get the latitude of your own locality a map will give the desired information. If you have the curiosity to determine it for yourself, take a fair-sized protractor and fasten a blade or pair of points along the 0-180 degree edge. When the sun lies directly south put the center of the protractor on the vertical edge of a level and turn the protractor until the 0-180 degree edge lines up with the sun. You can easily determine this by making the shadows of the points coincide. Read the degrees, marked by the vertical edge, from the 0 degree point. This will give the elevation for the sun on the day of the reckoning. If the reckoning was made at the vernal or autumnal equinox the reading would give the correct latitude without further calculation, but from the 21st day of March the sun rises above the equator until June 21. At that time it stands above the Tropic of Cancer, about 23 degrees north. Then it travels back and across the equator and on December 21 has descended about 23 degrees south and is over the Tropic of Capricorn. So you can say, roughly, that the sun moves north or south at the rate of about one-quarter degree per day. And this must be subtracted or added to your reckoning according to the season of the year.

To place the dial in the correct north and south position a reading should be taken on the north star. An easy method is to

fit two plumb lines to a frame a little higher than the head and sight from them. It is known that the earth wiggles a trifle in its rotation, so, to be strict, it is best to find when the pole star is at the meridian by means of the almanac; but again, since too fine work is thrown away on all but very exact readings, this is hardly necessary.

If the prospective dial-maker has never had an opportunity to indulge in celestial mechanics he is likely to find it quite as engrossing as a radio set.

A Chisel for Shingling

"Wooden shingles," writes H. C. H., "will be used for many years to come. When shingling hips and turning corners the edges of the shingles have to be pared. This is easy when the grain of the wood runs the right way, otherwise it is necessary to change position and reverse the tool.

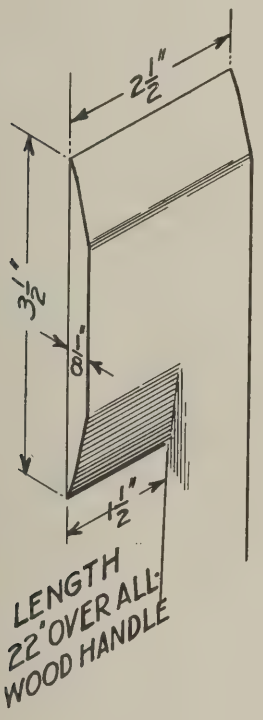


Fig. 7

"Here is a two-way chisel that any good blacksmith can make (see Fig. 7), and it will pay for itself on one house. If one starts to pare a shingle and finds it to be cross-grained, the chisel is pushed past it and a return stroke made. It should be tempered very hard and ground with a long bevel."

Capacity of a Tank

J. F. G. presents the following in connection with a gage for a cylindrical tank placed horizontally. It may be of interest to some of the readers.

"I had a tank which lay in a horizontal position (Fig. 8), and was drained from the bottom. What I wanted was a gage which I could insert in the top and thereby determine the number of gallons standing. First the tank was carefully leveled on its foundations. The tank was 60 in. diameter and 60 in. long. I wanted a gage that would give readings of 10 gal., 20, 30, 40, 50, 100, 200 300. If there was 60 cu. in. to one sq. in. of end surface it would take 3.85 sq. in. of end surface to make one gallon. For 10 gallons it would take 38.5 sq. in.

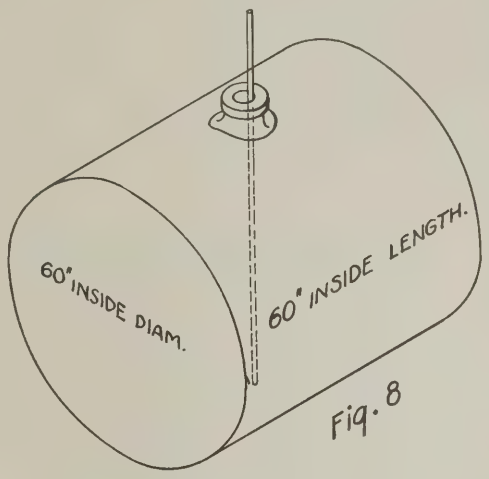


Fig. 8

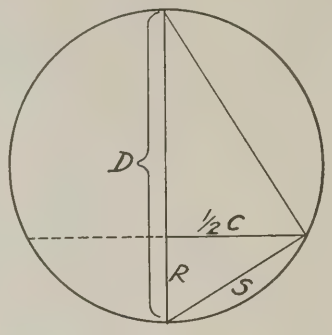


Fig. 10

Fig. 9

	RISE	DIVIDE RISE DIVIDED BY DIAMETER OF CIRCLE	AREA = (SQ. OF DIAM.) MULTIPLIED BY
		.040	.01 0538
10 gal.	2.43"	.0405	.0107
		.041	.01 0932
		.063	.020681
20 "	3.82"	.0637	.02104
		.064	.021168
30 "	5.10"	.085	.0321
40 "	6.18"	.103	.0428
50 "	7.2 "	.120	.0535
100 "	11.64"	.194	.107
200 "	18.78"	.313	.2104
300 "	25.68"	.428	.321

The point was to determine the rule of the arc which would give the proper area. So I turned to *Trautwine*. I found two columns which read: "Rise divided by the diameter of circle," and "Area equals square of diameter multiplied by." Under each of these was a column of decimals. To begin I took the equation Area = Diam.^{2} × X. X was to be the figure I should look for in the right hand column. The area was 38.5 and the diameter squared was 3600. The answer was .0107 which I approximated and followed across to the left hand column which marked .0405. According to this column the equation was Rise ÷ Diam. = .0405. And as the diameter was 60 the rise was 2.43 in. The columns are sketched out (see Fig. 9). "I was also curious about the surface area with the decrease in capacity and found an equation" chord = 2X √(diam. — rise) × rise. I couldn't understand this, so I drew Fig. 10 and marked it as shown. Then I found that since $(\frac{1}{2}C)^2 = S^2 - R^2$, and since the triangles are the same shape D:S as S:R or D × R = S^2. Then by rearranging I had $(\frac{1}{2}C)^2 = (DR) - R^2$, or $\frac{1}{2}C = \sqrt{DR - R^2}$, or $C = 2\sqrt{(D - R) \times R}$.

"I used to think that these handbooks were nice leather bound volumes for the experts, but this case and a few before have paid me well for their possession and I am not much afraid of them now."

Why Pumps Become Air Bound

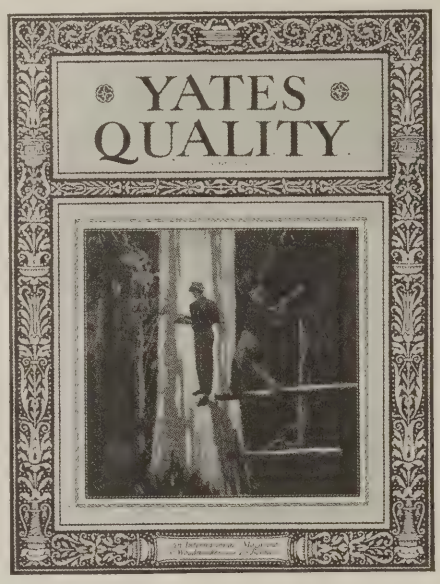
UNDER atmospheric conditions water contains about 2 per cent of air. When subject to a lower pressure than that of the atmosphere the air expands, and when given sufficient time, as while the water is flowing through a long suction pipe, the air will escape from the water in small bubbles. These bubbles will stick to the pipe or pump surfaces, or the air will gather in the pockets of the pump spaces. The trouble can largely be prevented by increasing the head of the suction supply and by operating the pump more slowly, so that the pressure of the suction water in the pump cylinder will be higher.

Announcements and Publications

The Star Line of Dairy Barn Equipment including stalls, stanchions, stock pens; litter, feed and milk can carriers; hay carriers, barn and garage door hangers, wire stretchers, hoists, coaster wagons and hardware specialties. This encyclopedia of barn equipment issued by Hunt, Helm, Ferris & Co. of Harvard, Ill., with branches in Albany, N. Y., Los Angeles, San Francisco, and Portland, Ore., presents the up-to-date developments of practical men who are themselves operating dairy farms and are continually putting to the test new devices for greater economy and efficiency. Plans of barns, dairies, hog houses, and construction specifications are shown in profusion with an immense variety of equipment shown in detail and as applied in practice. This encyclopaedic catalog is handsomely printed, 8x10 in page form and contains 292 pages exclusive of the cover.

"Hendricks' Commercial Register of the United States," 31st annual edition; 2,482 pages, 8½ by 11½ in.; price, $15. Published by S. E. Hendricks Co., Inc., 70 Fifth Avenue, New York. This publication is part of the company's information service, which includes a commercial bulletin and an information bureau, the bulletin being a monthly supplement keeping the register up to date, and the information bureau supplies special information and other service to subscribers. The new edition of the register shows an increase of 150 pages over the 1922 edition, including 125,000 changes and additions. The lists cover the electrical, engineering, machinery, building, manufacturing, chemical and other industries and allied industries. More than 18,000 products are separately classified with the name and address of manufacturers and producers with the trade name or brand if any. The classifications are made of easy reference by a system of indexing and cross indexing. Manufacturers and others, besides being listed under the products they handle, are also listed alphabetically. Brands, trade names and such matters are similarly treated.

"Yates Quality," is the significant title of one of the most unique privately owned magazines issued by an industrial organization. It vies with the great national magazines in the character of material and surpasses many in the technical and artistic qualities of its craftsmanship. The products of the P. B. Yates Machine Company, Beloit, Wis., are sought to be advanced by this handsome medium, but in a manner strikingly different to the usual run, as in no part of the reading matter is any reference made to the products of the company. *But,* the Yates company is the only advertiser in the publication and the several products are illustrated and given space for description as if each one was an ad for advertisers using varying amounts of space. As these advertisement have to do with machines which convert all sorts of lumber into high quality material for all sorts of construction purposes, with an unsurpassable finish and beauty, the relation between typographical excellence, literary interest and charm in the magazine and the machines designed to convert lumber



into beautiful forms, and shapes and finishes is all designed to express the ideal of "Yates quality." The magazine is sent free to all woodworkers and millmen making application under their own letterheads.

The Medart Company Line Shafting Equipment Catalog, No. 43—5½x7¾, 192 pages; The Medart Company, St. Louis, Mo. This condensed catalog presents the main facts about the most generally used line shafting equipment, giving dimensions, details of construction and list prices in a way to enable engineers, designers, mechanics and power users to plan installations. No attempt is made, it is stated, to show all the products of the company in this catalog, a more complete publication now being in preparation. The policy of the company being to make improvements as conceived and proved advantageous, consultation is invited before foundations or other permanent structures are built for the equipment described, so that verifying or correcting blueprints and other data required may be supplied. The condensed catalog contains carefully arranged and fully indexed data, halftones and detail drawings and a complete reference index.

Open Shop Held a Conspiracy — Announcement was made January 5 that agreements and contracts having for their purpose the maintenance of an "open shop" labor policy are held to contravene the conspiracy clauses of the Clayton Act under a ruling of Attorney General Daugherty.

While occasioned by a specific situation, relating to the Builders' Exchange of San Francisco, the opinion is declared to be sweeping in its scope and to cover generally, for the information of federal district attorneys, all phases of combinations affected, either by labor against employers or vice versa. The ruling was drawn after the attention of government officials was directed to formal charges that members of the San Francisco Builders' Exchange had agreed among themselves not to sell construction material to contractors who gave preference to union labor in filling their roster of workmen. The United States attorney at San Francisco was instructed to investigate and take whatever action seemed necessary. The indictment of 16 men, composing the wage committees of the National Association of Window Glass Manufacturers and National Window Glass Workers in Cleveland and the application for an injunction restraining them from putting into effect a wage contract agreement was necessary, according to government officials, to prevent "irreparable injury" to the industry and the public.

According to information received at Washington the two committees would have met at Cleveland to make effective an agreement which would have bound certain specified companies to close their plans for extended periods in order to curtail production and thus maintain prices. The 100 concerns named control the hand-blown glass industry of the United States. Attorney General Daugherty declared the department's action was directed as much toward the benefit of the workmen in the industry as to that of the public and of manufacturers, who were opposed to letting their plants remain idle.

The Current Winter Building Number of "Donley Devices," a 4-page folder published by the Donley Brothers Company, Cleveland, is one of particular seasonal interest to contractors. The publication deals with the general advantage in winter construction, and with heating devices necessary to the work. "There is a decided difference of requirements on different jobs and in meeting the views of different users," says the booklet, which then proceeds to explain how Donley Salamanders have been built to meet contractors' needs. A small salamander, weighing only 35 pounds, is intended for use on the scaffold.

The Situation

THE increasing activity of building work in California and the South seems to forecast conditions elsewhere as soon as the winter season is over. In the Northeast the country is under a blanket of snow—at this writing—and work is consequently somewhat interrupted, but in the Central West, particularly in the Chicago district, building permits continue to break all records for the winter months. Prices of building material in general show little recession and wages everywhere remain at high levels. Scarcity of labor is the most talked of subject with employers in all lines of industry, and according to some, production of basic commodities like steel is already being seriously handicapped by want of man power.

Building Estimates

Estimates of construction work accomplished in 1922 range all the way from $2,500,000,000 to $5,000,000,000. As analyses of NATIONAL BUILDER's questionnaires returned by subscribers show that the readers of this journal alone constructed $1,500,000,000 worth of buildings in 1922, we are inclined to believe that an estimate of $5,000,000,000 for the total of all construction last year is not extravagant.

In connection with a careful and comprehensive survey of the building field to determine the market possibilities of its products the Copper and Brass Research Association estimates the total building construction for the year 1923 at $6,000,000,000. In 1922, statistics for 11 months of which are now available, the total expenditure for building construction is placed at $4,910,000,000. In addition, there were projected (but not built) other buildings of a total estimated cost of $2,480,000,000.

In other words, in 1922 there was developed an actual building program of $7,390,000,000. Of this huge amount a little less than $5,000,000,000 has actually been constructed and the remainder is carried over into 1923.

In estimating the amount of building construction in 1923, the carry-over from 1922 has been reduced to $1,240,000,000, because experience indicates that in making preliminary estimates the cost is usually placed on the safe side, and allowance is also necessary for the percentage of such projects as have been indefinitely postponed or will not come up in 1923.

Taking the known accumulated shortage as a basis, after deducting work completed during 1922, and adding the normal increment of building for the year 1923, the actual building requirements of the nation are estimated at $7,830,000,000. The details of the 1923 estimates, as well as the expenditures for the same classes in 1922, are shown in the following tabulation:

	1923 estimates	1922 expenditures
Apartment houses	$1,253,000,000	$950,000,000
Churches	530,000,000	205,000,000
Dwellings	940,000,000	680,000,000
Hospitals	595,000,000	230,000,000
Hotels	851,000,000	640,000,000
Industrial buildings	827,000,000	655,000,000
Office buildings	804,000,000	645,000,000
Public buildings	328,000,000	260,000,000
Public garages	162,000,000	125,000,000
Schools	1,540,000,000	610,000,000
Totals	$7,830,000,000	$5,000,000,000

Exalted Labor

What labor conditions will be next year, if this program is attempted, can perhaps be better imagined than described. An Eastern newspaper, however, describes a curious and interesting situation in that section of the country, where perhaps there has been a greater scarcity of certain kinds of building trades labor than anywhere else. James P. Kelly, a builder in Brooklyn, N. Y., tells his experience about "commuting plasterers" as follows:

"I happened to be called to Philadelphia one day not long ago," said Mr. Kelly, "and got the 8 o'clock train out of New York. On the train I noticed a group of five Italians. I noticed that they had their rolled-up overalls with them, their kit bags for their tools and their lunch pails. They had the plaster on their hands and shoes, too, just as if they were going on the daily job.

"I was so curious about their being on the train for Philadelphia that I questioned them. True enough, they were going to work and they were getting $25 a day in Philadelphia. I asked the conductor about them and he told me, sure, the gang was on the train every morning, regular as the train itself.

"I suppose there was a big job in Philadelphia that had to be finished in quick time, before the renting season was lost. Under such circumstances it might mean a greater loss to a builder to let the work drag indefinitely, with no assurance of completion, than to pay $25 a day a man for the plastering.

"These workmen paid out $6 a day for carfare, their hours were easy and they had $19 a day net wages, after paying transportation."

Demanding Better Houses

Regarding present building costs, Mr. Kelly also had some very pertinent remarks: "I agree that the cost of building is more than double the pre-war cost and rents must be proportionately high. The cost of labor and materials today is close to 200 per cent of what it was prior to 1914. But there is another factor that most people overlook.

"Do you realize that refinements and luxuries that go into homes today, and are demanded as necessities by homeseekers, have added 40 to 50 per cent to the cost of building, compared with, say ten or fifteen years ago?

"The modern house has to have parquet floors, electric lights and fine fixtures, tiled bath and kitchen, or nobody wants it. These people who sigh for the houses of pre-war days wouldn't take the average cheap pre-war house at any price. It wouldn't have the parquet floor, or the tiled bath and kitchen. Probably it would have gas lighting, and plain gas fixtures."

The same thought developed in more detail comes from Louisville, Ky., where the consensus of opinion among architects, builders and building material dealers is recorded as follows:

"With the growing importance of the small house it becomes very necessary that its design be intrusted to the care of a trained specialist.

"In the small house every square foot of floor space must be utilized and made to serve two purposes where practicable instead of one. For example, the living-room may also serve as a reception hall or dining-room perhaps. The sleeping porch, if glassed-in, may at times serve as a very attractive sun room. The fireplace must be placed where it will heat as much of the house as possible, for a heating plant cannot be afforded. Plumbing fixtures must be located so as to minimize the amount of piping and labor.

Best Is the Cheapest

"Rigid economy must be practiced. In regard to foundations, plumbing fixtures and the roof, the best will prove the most economical in the long run. Nor does it pay to slight that part of the construction that is to be concealed. Insist on mouse proofing. Do not be deprived of the comfort in the way of plenty of electrical outlets and switches. Make your rooms smaller if necessary; a small room conveniently arranged is superior to a large one poorly planned. You should have a fireplace—and what cottage or mansion is complete without this cheery feature.

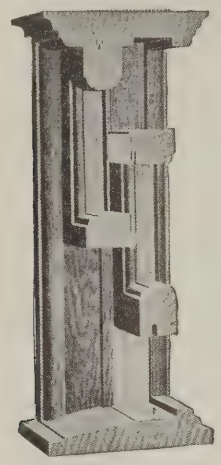
"Not only should the small house be well built but the owner has a right to expect it to be attractive both inside and out. Beauty in the small house is not so much a matter of expenditure. It is a matter of good planning, good proportions and harmony of design. Everyone has seen mansions that were hopelessly ugly and cottages that were charming."

In conclusion, institutional, commercial and industrial building shows signs of activity, but the enormous demand for housing goes on apace.

New Devices, Methods and Improvements in the Building Industry

Selling Weatherstrips the Year Round

MANY contractors and builders do a great deal toward spreading their business over the entire year by doing in summer what can best be done in warm weather and leaving until winter the things that can easily be done when the temperature is low.



Courtesy Federal Metal Weather Strip

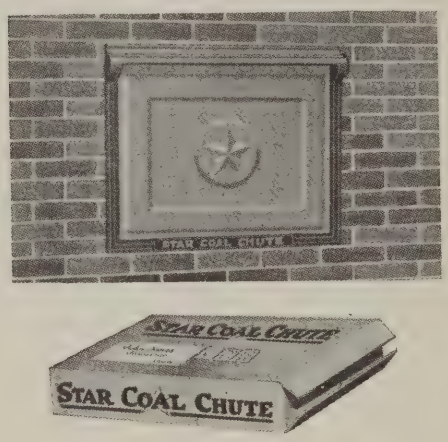
Cold weather is of material aid to the builder in selling weatherstrips. It focuses the attention of his customers on weatherproofing equipment with little effort on his part. But what contractor or builder has ever thought of getting weatherstripping business the year round? Now, during these cold days when you are doing weatherstripping as an important part of your business, is a good time to give some thought as to how you can continue to enjoy business of this kind next summer.

An idea in this connection comes from the South, where more and more weatherstripping is being sold by contractors and builders as a means of making houses not only cold-proof but also heat-proof. Insulation of any kind insulates against heat as well as cold, but few of us stop to think about that. The makers of vacuum or thermos bottles know it to be true, however, and they supply us with bottles which will keep their contents either hot or cold.

Why not use the same principle in selling weatherstripping? The house so equipped is warmer in winter but cooler in summer. Hot winds are kept out and cool air kept in the house in the summer by the same device that keeps cold winds out and warm air in in the winter. Furthermore, the dust does not blow or seep into the house around the windows and doors in summer when the house is weather-stripped. This protects the window curtains and draperies, the rugs and other floor coverings, and helps to keep the walls, woodwork and furniture clean for a greater length of time. A weatherstrip of the type illustrated resists considerable wind pressure and seals the openings against dust and dirt.

Merchandising Coal Chutes

A SUBSTANTIALLY and practically designed coal chute is marketed by the Sterling Foundry Company, Wallace Street, Sterling, Ill., in which the points of advantage include a cast-iron frame with clear opening of 15x20 in. and overall dimensions of 24x19x5 in., with lugs on all four sides for anchoring into masonry of foundation walls. There is watertight housing on top giving absolute protection to the door against weather. The door is of stamped sheet galvanized 18-gage steel embossed and exceptionally rigid. The hinges are concealed and protected under housing designed to automatically lock the door in an open position, and there is an automatic lock at the bottom to lock the door shut. An extension chain may be attached for operating the catch, thus avoiding the necessity of climbing over coal or other obstructions to reach the door. The entire equipment is as sightly as durable. It weighs 41 lbs. and is shipped in a substantial fiber carton making it possible to ship by parcel post or express at less than freight rates in the first zone. The compactness, quality and small bulk indicates an advance not only in production but in meeting the requirements of merchandise distribution of this type.



Gunite

GUNITE is the name given to the product of a process of mixing previously mixed dry cement and sand with water under dry air pressure and water pressure and shot through a hose to impact against any surface to be concreted or stuccoed. Owing to the method of application and the uniformity of mix gunite has qualities peculiar to itself, in addition to the speed and economy of its use on large work. In a comprehensive paper on "The Cement Gun —Its Application and Uses," read by Bryan C. Collier, member Am. Soc. C. E., before the municipal engineers of the city of New York, December 23, 1918, and reprinted with illustrations as Bulletin 122 by the Cement Gun Company, Inc., 30 Church Street, New York, the origin of the cement gun, details of its construction and the application of gunite and its qualities are described. Other bulletins from the same source give the results of practical construction with gunite and of numerous tests, showing the superior strength and impermeability of cement mortar so applied. The

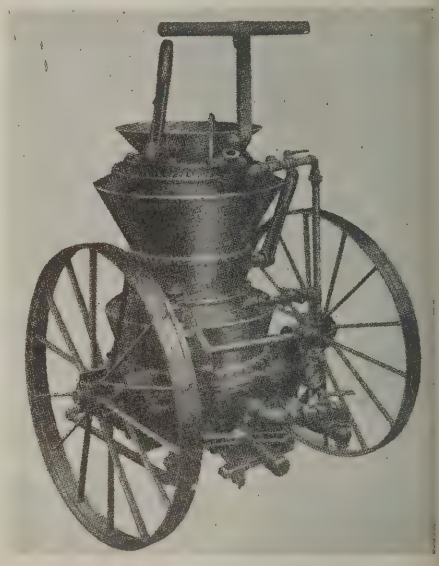


Fig. 1—Cement gun

illustration, Fig. 1, shows the cement gun, which divides the dry cement and sand into small amounts by a method of "feed" in which small pockets in the periphery of a revolving wheel allow an intermittent action, thus avoiding clogging of the material in the hose. Continuous operation is obtained on the principle of a locking and working chamber of a caisson, the working or dis-

(Continued on page 74)

How to Make Soft Woods Beautiful as Hardwood

IT is generally admitted that wood finished in its natural shade cannot be worked as successfully into color schemes of decoration as stained wood. It is also true that color brings out the grain and enhances the natural beauty of most woods. For these reasons we manufacture a line of wood colors known as Johnson's Wood Dye.

Johnson's Wood Dye is for the artistic coloring of wood. With it inexpensive soft woods such as pine, cypress, fir, etc., may be finished so they are as beautiful as hardwood. Johnson's Wood Dye is very easy to apply—it goes on easily and quickly without a lap or a streak.

Johnson's Wood Dye is a ***dye*** in every sense of the word. It penetrates so deeply that the natural color is not disclosed if the wood becomes scratched or marred—it brings out the beauty of the grain without raising it in the slightest—it dries in four hours and does not rub off or smudge.

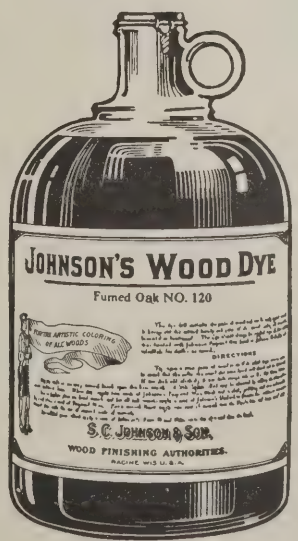
Johnson's Wood Dye is made in 15 shades, all of which may be easily lightened, darkened or intermixed—full directions on every label.

JOHNSON'S WOOD DYE

FREE—Book on Wood Finishing

It's the best book ever published on Artistic Wood Finishing — the work of famous experts — illustrated in color. This book is written for the practical man—it gives covering capacities, includes color charts, etc. We will gladly send it free and postpaid.

Use Coupon at Right



S. C. JOHNSON & SON
Dept. N. B. 2, Racine, Wis.
"The Wood Finishing Authorities."

Please send me free and postpaid your Book on Wood Finishing.

I usually buy varnishes from.....

.....

My Name.....

My Address.....

City and State.....

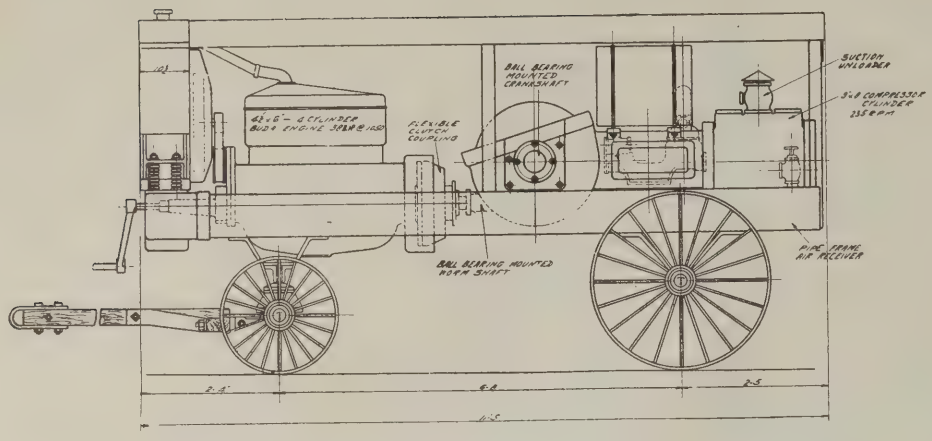


Fig. 2—Traylor gas-driven portable compressor for use with cement gun

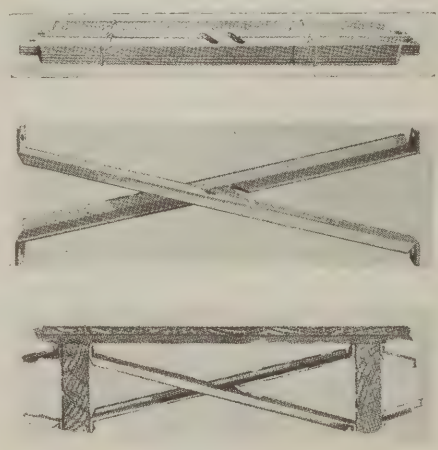
charge chamber always under pressure, the supply materials being introduced through the upper chamber. As the dry mixed material is forced through the hose to the nozzle, it is hydrated by the water being introduced through the walls of the nozzle by needle jets under higher pressure than the air, causing the jets to puncture the stream of flowing material. The action of the air in the main hose causes these jets to become atomized, resulting in the covering of all the particles with a fine spray. Fig. 2 shows a type of compressor used in connection with the cement gun, but of which there are several types on the market. That shown is a gasoline driven portable compressor also made with electric drive for mine work.

The advantages claimed for the cement gun are: 1. By its use methods of construction can be developed that will eliminate to a large extent the use of forms, and for those forms or panels that are necessary no provision need be made for heavy bracing to withstand hydrostatic heads, as is the case with poured concrete. 2. The material produced is much stronger in all tests than any concrete or hand-placed mortar yet produced, thereby permitting reduction of sections to a very considerable extent. 3. By its use a demarkation line between work previously placed, which is an objectionable feature in poured concrete, is eliminated. It has been definitely proved that the joint between new and old sections of gunite is as strong as the gunite itself, and between old concrete and gunite, stronger than the concrete.

The use of the cement gun in dwelling construction, it is said, has been highly developed by a firm of contractors in Los Angeles, Calif. Their method of construction is to place over the studs, which have been spaced at ordinary widths, a layer of tar paper, stretched tightly and fastened to the studs. A layer of reinforcing mesh is added, and then the gunite is shot on to a thickness not exceeding one inch. Within a few minutes this surface is brought to a true plane by a darby shaped like a desk rule, using the sharp edge to cut through the mortar. This is finished either by floating with a carpet-shod float, or by a flash coat with the cement gun. Very beautiful effects have been obtained by using pure quartz and white cement to make the finish, or by using pigments for color effects.

Steel Joist Bridging

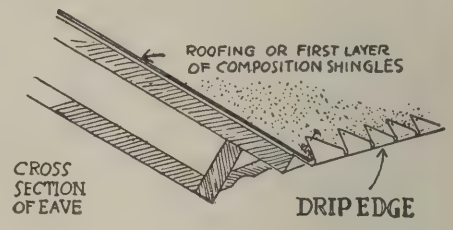
STEEL joist bridges are one of the new things on the market. The several claims for them include the saving incident to cutting bridging and by handling one piece in the steel bridging as against two in the old way, labor cost is cut in two. They are neater appearing and give less space for dust and will last 100 years. Steel bridging is always tight as there is no shrinkage,



drying out, warping or splitting. It costs less to install than wood. The illustrations show the steel bridging in bundles. All that is necessary is to cut the wire than binds the bundle, spread apart as shown in the second illustration and apply as shown in the third illustration. The bridging is made in two sizes for 12-in. and 16-in. centers, and in 16 and 18 gauges. Manufactured by the Steel Joist Bridge Co., Kankakee, Ill.

Miller Drip Edge

A METAL strip which neatly finishes and securely fastens composition roofing edges has been developed by Miller & Gleason, Olean, N. Y. Looked at from the end the strip has the shape of a "V" laid down on one of its sides. Looked at from the bottom it has (except for small notches) a

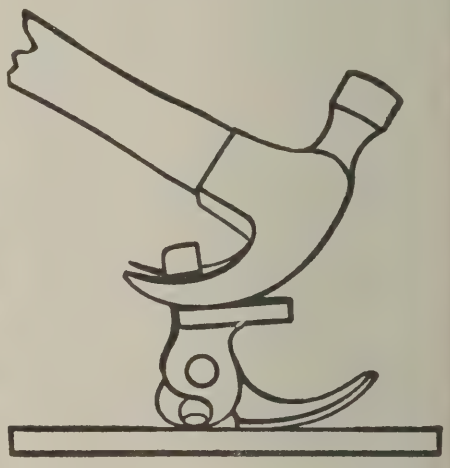


plain surface of uniform width, while looked at from above, it has a saw tooth appearance. Strips are made about 30 inches in length which can be cut or lapped with others to give any desired length.

The purpose of the "drip edge" is to support and securely fasten with half the usual nailing and give a finished appearance to the eave and gable roof edges of composition roofing. It supplies the need of properly fastening and finishing roof edges.

A Pocket Nail-Puller

AMONG the new devices recently issued by the Goodell-Pratt Company, toolsmiths, Greenfield, Mass., is a pocket nail-



puller made of drop-forged steel and small enough to be carried in the pocket. The illustration shows its simple design and the method of using.

Air Filters

AIR filters serve the purposes of: (1) Protecting human life and health by purifying the air for breathing, as in industrial plants of all kinds, schools, theaters, hospitals, hotels and homes, etc.

(2) Protecting food and other products for human consumption from the dangerous contamination by dust, as in bakeries, dairies, flour mills, canning and packing plants, cold storage and ice making plants, candy factories, etc.

(Continued on page 76)

SERVICISE *the* ROOFS

Servicised Giant Shingles

Servicised Mammoth Shingles

Servicised Interlock Shingles

Standard Individual Shingles

4 in one Strip Shingles

Servicised Insulation Wool

Servicised Pipe Covering

Servicised Asbestos Furnace Covering

Concrete Floor Paint

Shingle Stain

The Servicised Shingle Span—

assures a ventilated, non-sweating, non-rotting, heat-resisting and cold-insulated roof. It holds the shingle rain and wind tight, and will save better than $3.00 per square on laying costs. Try this modern method on your next roofing job. Slate and Asbestos shingles are laid by this new method at a surprisingly low cost.

Inter-Lock Shingles—

The lock-ends of these shingles prevent blowing up in the wind. Expansion and contraction are taken up from one row to the other. They are self spacing, and can be laid a greater length to the weather.

These shingles make a roof of unusual design—a beautiful and artistic inter-woven pattern.

Insulation Wool—

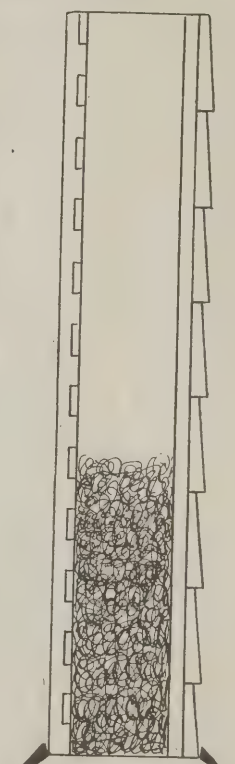
This mineral wool is positively fire-proof, and has unusually efficient insulating qualities. It is an effective sound deadener, and will last as long as the building it protects.

Servicised Expansion Joints—

This material is indispensable for the proper laying of cement walks and floors. The body of this material compresses and re-expands. Unlike most expansion joints it is non-oozing, and cannot be squeezed out like paste from a tube.

Servicised Products—

These products are rapidly attaining the conquest of their market by reason of their easily recognized higher quality. They are outselling on the comparison of superiority, beauty, durability and price.



SERVICISED PRODUCTS Co.

First Nat. Bank Bldg. Chicago, Illinois

SERVICISED LOOK FOR IT ON ALL PURCHASES

C 1920

Servicise the Cement Walk and Basement with SERVICISED EXPANSION JOINTS

(3) Protecting the sensitive parts of machinery, apparatus and instruments from the destructive action of dust and grit, such as turbo-generators, motors, air compressors, gas and gasoline engines, tractors and motor trucks, telephone and telegraph apparatus, optical instruments, etc.

(4) Protecting merchandise from deterioration and loss of value due to dust—for instance, in department stores, linen and dry goods stores, candy and food stores, museums and art galleries, jewelry stores, homes, etc.

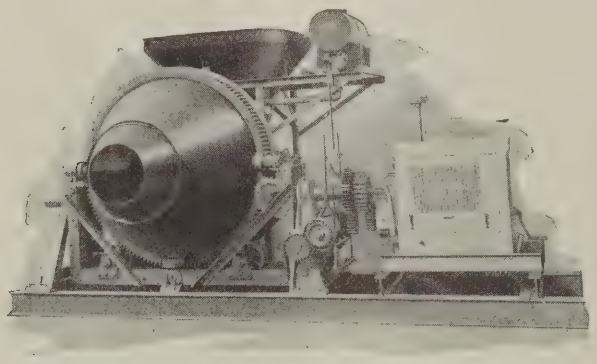
(5) Removing dust from gases used as fuel for motive power, such as blast furnace gasses, etc.

(6) Preventing waste by arresting and retaining valuable materials in dust form, such as precious metals, chemicals, textile raw materials, etc.

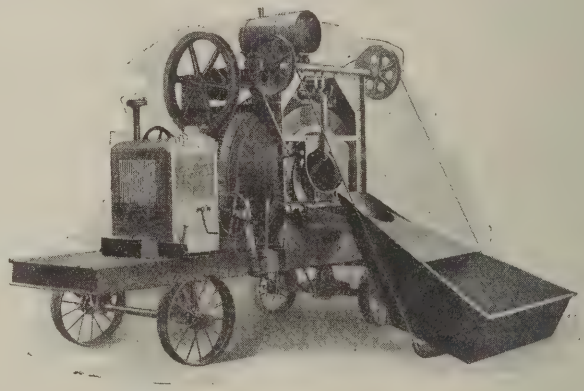
The varied forms in which air filters are designed to accomplish the purposes indiciated are illustrated and described in a catalogue issued by the Midwest Steel and Supply Company, Inc., 28 West 44th Street, New York.

A Compact Power Unit for Mixers

A RELIABLE power-unit for mixers speeds up production and is an insurance against expensive delays. The T. L. Smith Company, Milwaukee, announces the adaptation of Smith mixers to the Le Roi power-unit, which includes in an exceptionally compact form a fully equipped power plant consisting of a four-cylinder engine with radiator, magneto, carburetor, governor, fan and fan belts, fuel tank, air cleaner and an automotive type clutch, the combination representing a maximum of mixer speed, economy and durability.



Smith 21-S tilting mixer with batch hopper on skids and power-unit



Smith 14-S non-tilting mixer, charging side, with power-unit

Hard Facts About Concrete

DO YOU know that no other single factor has so great an effect upon the strength of concrete as has the amount of water used?

Thousands of tests conducted at the structural materials research laboratory, Lewis Institute, Chicago, prove that a direct relation exists between the quantity of water used in mixing concrete and the strength of the resulting concrete. *These tests mean money to the builder because strength is what he is after.*

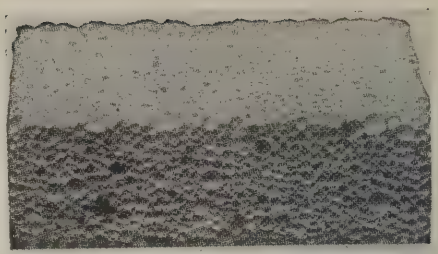
A variation of 10 per cent above or below the correct amount of mixing water may reduce the strength of the concrete by 30 per cent or more. The very wet, sloppy mixtures that are sometimes used in building construction result in a loss in many instances of from 50 to 60 per cent of the possible strength of the building.

Within the range of plastic mixtures, the strength falls off rapidly with the addition of a small amount of superfluous water; in a one-bag batch the addition of even one pint of water more than is necessary to give a workable mix results in the same loss of strength as if from two or three pounds of cement were left out of the mixture. *That's money out of the pocket for the builder.*

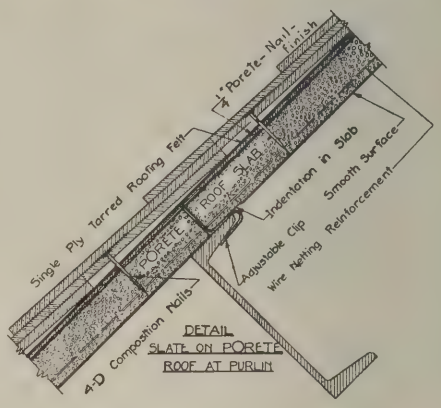
The exact amount of water required for any particular mixture of aggregates to obtain the greatest strength in the concrete can be determined only by actual test. Workability of the mixture is important and must not be sacrificed. As a basis for trial with well-graded aggregates up to 1½ in. in size, and a 1:2:4 mix, use 6 to 6½ gal. of water per sack of cement. For a 1:2:3 mix begin with 5¾ to 6 gal., and for a 1:1½:3 mix, 5½ to 6 gal. *Remember: Use the least amount of water that will give a workable mixture.—The Concrete Builder.*

Porete—A New Base for Slate or Tile Roofing

PORETE is the name of a comparatively new product by the Porete Manufacturing Company, 26 Verona Avenue, Newark, N. J., designed as a base for slate and tile roofing or wherever a light "nailing" concrete is desirable. It is said to possess the permanency of concrete with the lightness of wood, being a mixture of portland cement, sand and a fibrous fireproof material. The roof weighs but 8 lb. per square foot. Has a smooth finish underneath, provides excellent insulation and will not sweat in cold weather. The slabs can be cut with ease and fitted to conform to the most complicated roof design, and can be erected without difficulty in cold weather.



Porete—a "nailing" concrete base



The "Open Shop"

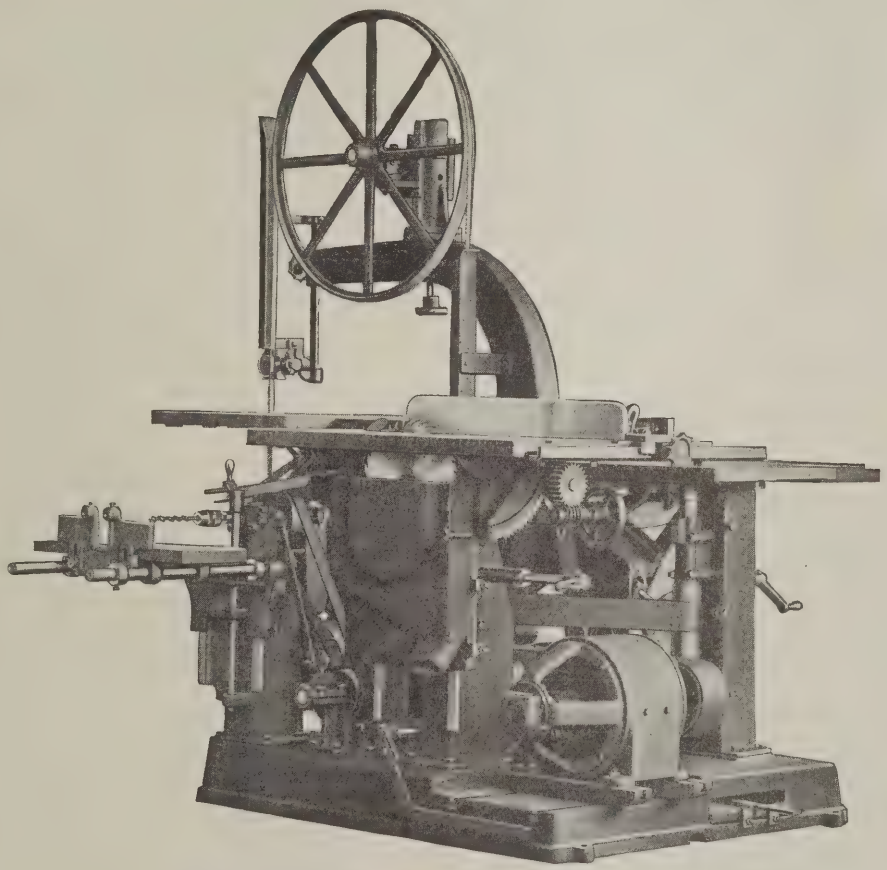
THE ruling of Attorney General Daugherty at Washington that the conspiracy clause of the Clayton Act applies to employers who enforce the "open shop" through so-called boycott of non-member employes favoring unions is not expected by John S. Partridge, counsel for the San Francisco Builders' Exchange, to affect the local labor situation.

"The Clayton Act, like the Sherman Anti-Trust Law, applies only to interstate cases," Mr. Partridge said. "The maintenance of the 'American plan' by the builders' exchange is a local matter."

(Continued on page 78)

NEW MODEL CRESCENT UNIVERSAL WOOD WORKER

No. 101 to No. 112



The Crescent Machine Co., 10 Main St., Leetonia, Ohio, has surpassed its former achievements in the building of Universal Wood Workers and now offers you the Universal Wood Worker you have been waiting for. This space is too limited to do justice to the good points of this improved machine, but you will find them in the special circular that will be mailed to you on request.

Casement Windows

CASEMENT windows are recognized by leading architects and house designers as the ideal window for practically all classes of buildings but particularly for dwellings of all kinds because they conform to artistic design, are of simple construction and provide the widest range of controllable ventilation.

The greatest obstacles to their general use have been (1) leakage, (2) binding in rainy weather and (3) curtaining and cleaning difficulties.

If swung inwards they invariably leaked badly, interfered with curtains and prohibited shades excepting when the window was closed as all drapes, etc., had to be attached to the sash itself and swing with it to prevent tearing.

If swung outwards these obstacles were partly removed but in their stead came the cleaning problem which was very inconvenient if not entirely impossible.

A practical form of casement window, perhaps new to most readers, has now been perfected, however, and its successful overcoming of all former objections is attested by its increasing popularity and its adoption for use in all classes of buildings ranging from the bungalow to the office building and including many government hospitals.

The patented features of the window comprise the hardware fittings only (which have been designed with a view to simple application by the ordinary mechanic) and thus, perfect freedom in the design, size and purchase of sash and frames is allowed. There is a limit set for the sash size but it is so generous that it is seldom reached.

In general these windows are of the folding type. They are not hinged to the jambs but are usually installed in units of two sash as a pair hinged together at the meeting stiles. They may be folded to either jamb or left at any intermediate point. Single sash also may be used but are attached permanently to one jamb and can be reversed only sufficiently to provide access for cleaning.

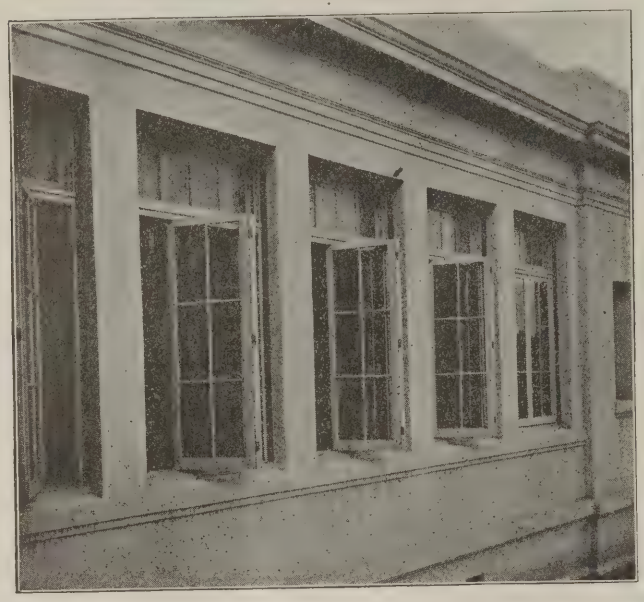
The hardware, however, is built on an entirely different principle from that used on any other window. Its most outstanding feature is that it suspends the sash entirely from the head so plenty of clearance may be left at the sill to take care of slight variations from level as well as to prevent binding in rainy weather when the sashes swell. Although the sill clearance permissable would cause any other window to leak, this window is water tight at this point as well as at all others.

There are outside and inside stops at both jambs, the meeting stiles are rabbetted or made with an astragal and there is a double stop at the sill formed by the stool and the upstanding flange of the sill track. It is claimed that weather strips are seldom if ever necessary and need be installed only to make the windows absolutely air tight.

The hardware consists of tracks for head and sill, roller hangers for the top, sliding guides for the sill, butts, locks and a handle. The material is made in several qualities so that a grade suitable to any kind of building may be selected.

Advantages claimed for this window are

(Continued on page 80)

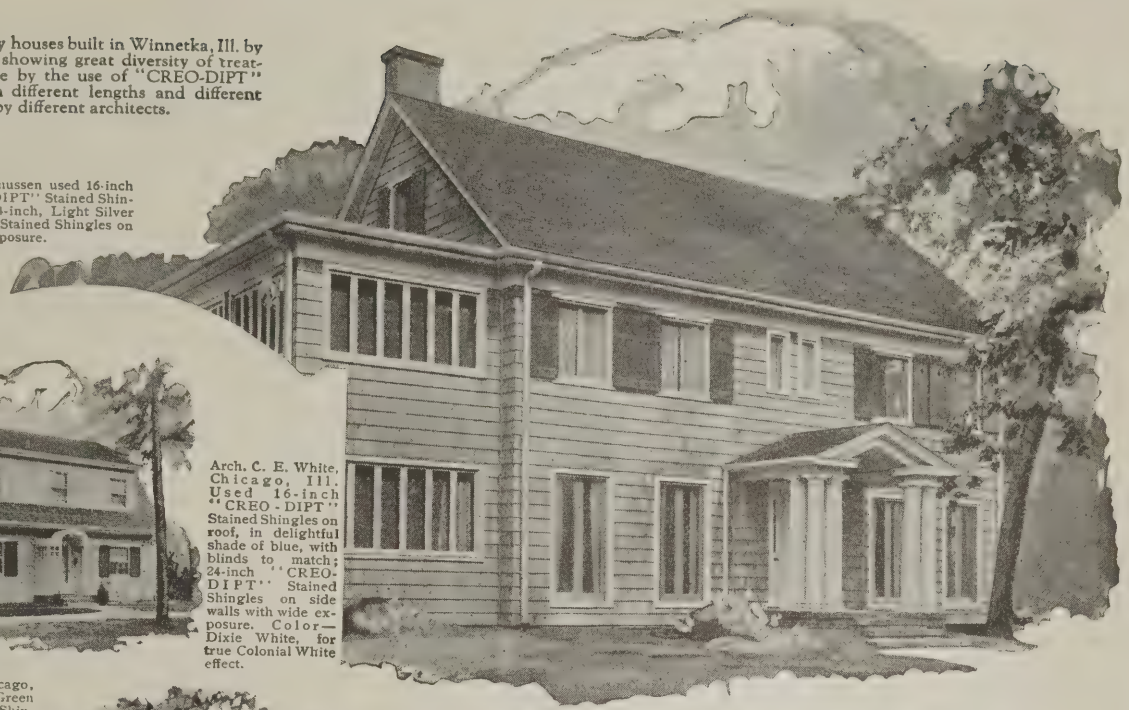


Illustrating the accessibility and adaptability of casement windows

Casement windows allow of the maximum use of available window space and blend with characteristic harmony into the architectural quality of the exterior and interior of buildings

A selection of many houses built in Winnetka, Ill. by Frederick Cooper, showing great diversity of treatment made possible by the use of "CREO-DIPT" Stained Shingles in different lengths and different colors as specified by different architects.

Architect F. W. Rasmussen used 16-inch Moss Green "CREO-DIPT" Stained Shingles on roofs; long 24-inch, Light Silver Gray "CREO-DIPT" Stained Shingles on side walls with wide exposure.



Arch. C. E. White, Chicago, Ill. Used 16-inch "CREO-DIPT" Stained Shingles on roof, in delightful shade of blue, with blinds to match; 24-inch "CREO-DIPT" Stained Shingles on side walls with wide exposure. Color—Dixie White, for true Colonial White effect.

Architect C. E. White, Chicago, used 16-inch Moss Green "CREO-DIPT" Stained Shingles on roof; 24-inch Weathered Gray "CREO-DIPT" Stained Shingles on side walls with wide exposure.

Architect Charles E. White, Chicago, used 16-inch Moss Green "CREO-DIPT" Stained Shingles on roof.

Arch. C. E. White used 16-inch Nut Brown "CREO-DIPT" Stained Shingles on roof. 24-inch Weathered Gray "CREO-DIPT" Stained Shingles on side walls with wide exposure.

IN Winnetka, Ill., near Chicago, one is attracted to the large number of all-shingle houses with their great diversity of color treatments.

Not the least factor in this influence is the wide shingle exposure treatment on side walls shown in the accompanying photographic reproductions. The long 24-inch shingle side walls with 10-inch exposure not only insure good architectural effects but invariably give individuality not secured by the use of other building materials.

"CREO-DIPT" Stained Shingles are made only of straight grain, red cedar. Pure earth pigments ground in linseed oil are carried into the wood fibres with creosote. Colors last a lifetime. The open market does not afford such quality in either shingles or stain.

Send fot Portfolio of Fifty large Photographs of Homes of all sizes by Prominent Architects. Ask about our special "CREO-DIPT" Stained Shingles for Thatched Roof effect; also the large 24-inch "CREO-DIPT" Stained Shingles for the wide shingle effect on side walls, either in Dixie White for the true Colonial white effect, or shades of green, brown, red or gray.

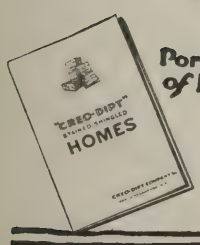
CREO-DIPT COMPANY, Inc.

General Offices, 1072 Oliver Street, North Tonawanda, N. Y.

Factories: North Tonawanda, N. Y. and St. Paul, Minn.

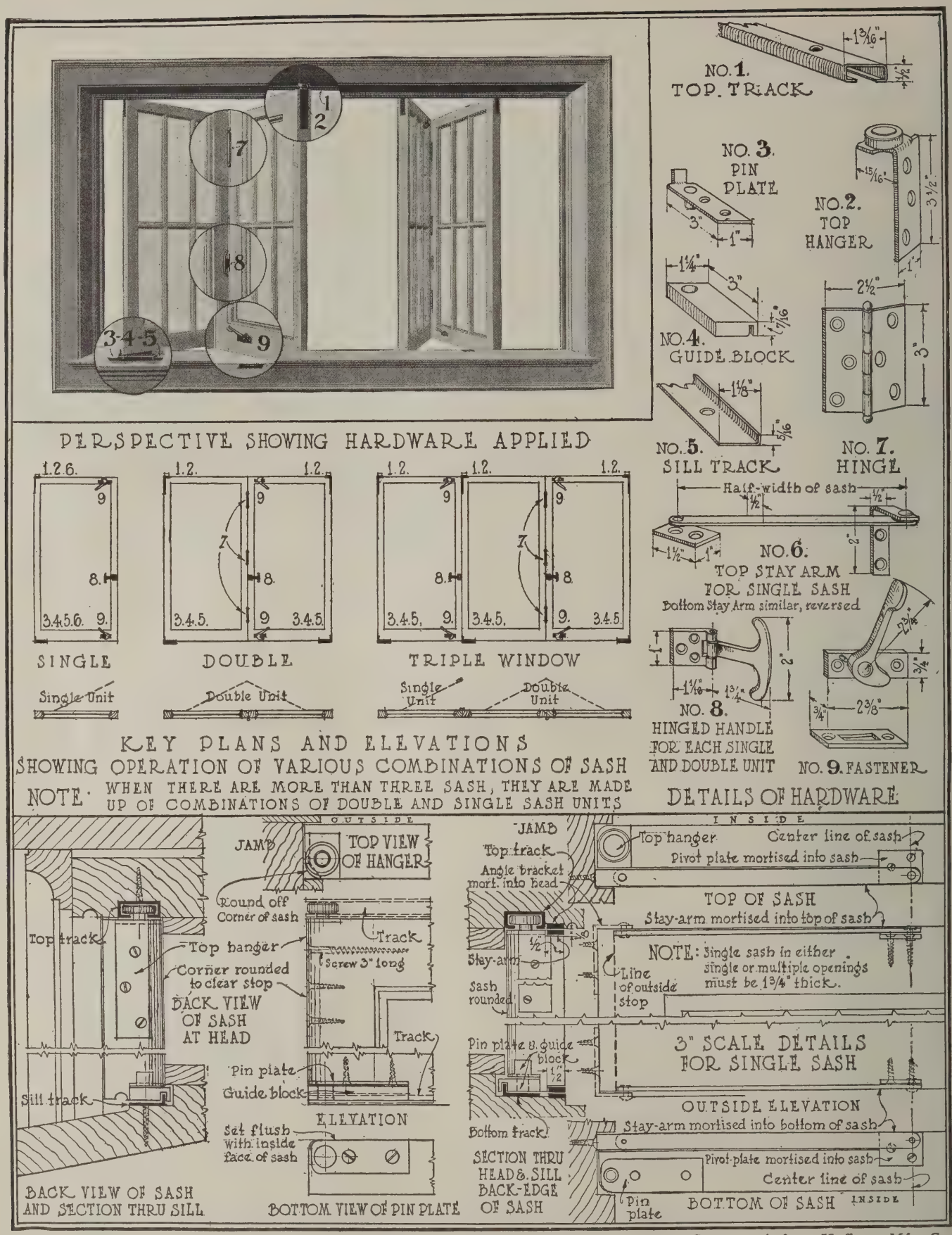
Sales Offices: Principal Cities

Leading Lumber Dealers Everywhere Carry Standard Colors in Stock



Portfolio of Homes

"CREO-DIPT" Stained Shingles


PERSPECTIVE SHOWING HARDWARE APPLIED
SINGLE
DOUBLE
TRIPLE WINDOW
KEY PLANS AND ELEVATIONS
SHOWING OPERATION OF VARIOUS COMBINATIONS OF SASH
NOTE: WHEN THERE ARE MORE THAN THREE SASH, THEY ARE MADE UP OF COMBINATIONS OF DOUBLE AND SINGLE SASH UNITS
NO. 1. TOP TRACK
NO. 2. TOP HANGER
NO. 3. PIN PLATE
NO. 4. GUIDE BLOCK
NO. 5. SILL TRACK
NO. 6. TOP STAY ARM FOR SINGLE SASH
Bottom Stay Arm similar, reversed
NO. 7. HINGE
NO. 8. HINGED HANDLE FOR EACH SINGLE AND DOUBLE UNIT
NO. 9. FASTENER
DETAILS OF HARDWARE
BACK VIEW OF SASH AND SECTION THRU SILL
TOP VIEW OF HANGER
ELEVATION
BOTTOM VIEW OF PIN PLATE
SECTION THRU HEAD & SILL BACK-EDGE OF SASH
TOP OF SASH
OUTSIDE ELEVATION
BOTTOM OF SASH
NOTE: Single sash in either single or multiple openings must be 1¾" thick.
3" SCALE DETAILS FOR SINGLE SASH

Courtesy Andrew Hoffman Mfg. Co.

Details of Casement Hardware

complete weather protection, freedom from binding or sticking, convenient cleaning from an inside position, unlimited choice in curtains, shades, etc., the exact and perfect regulation of ventilation and the elimination of expense for maintenance.

Another feature is that for enclosing porches all mullions may be omitted and any number of sashes installed which may all be folded to either jamb. Installations have been successfully made in openings having a clear span in excess of thirty feet.

Screening is simple and convenient, and may be done in several ways as detailed.

Construction details and window hardware illustrated are furnished by courtesy of the Andrew Hoffman Manufacturing Co., 28 East Jackson Boulevard, Chicago.

NA

The Only Journal Devoted Exclusively to the Contractor, Architect and Builder

National Builder

JUN 12

ESTABLISHED 1864

Volume 66 March, 1923 Number 3

BERMICO
Sheathing Paper

Bermico is a safe guide to efficiency and economy. The home it protects is always cooler in summer and warmer in winter; and it lasts, because it is made of pure New England and Canadian spruce, sized with rosin.

Manufactured by
BROWN COMPANY
Portland, Maine
New York Chicago

NIBROC KRAFT The Wrapping Paper
NIBROC TOWELS ONE WIPES DRY

Hundreds of thousands of DUNTILE were required here. DUNTILE manufacturers can compete successfully on such jobs because DUNTILE Builds Better Buildings Cheaper

Wherever DUNTILE Is Made

It Soon Becomes Preferred Building Unit

ANY man in the building field who would like to enter a business with an assured future, or any company that seeks to extend its activities with a very moderate outlay of money, should investigate DUNTILE. While the illustrations above tell a graphic story of an opportunity that exists in every community, they barely hint at the almost unlimited market awaiting new DUNTILE manufacturers.

DUNTILE

the great light-weight, building unit, which is made in eight standard sizes on the DUNN Automatic Machine,

Builds Better Buildings Cheaper

This unique concrete unit has proved its adaptability to every type of construction. It has demonstrated over and again that it is an actual money saver for the builder, a great convenience to the architect and a producer of extra profits for the contractor. Is it to be wondered, then, that DUNTILE speedily becomes the preferred building unit wherever it is introduced? Or that the demand for it results in remarkable returns for its manufacturers?

Of Course You Want "BASIC FACTS"

This is the name of an extremely interesting book we will gladly send without any obligation on your part. It outlines the truly stupendous future of this business, and provides facts and figures, from the experience of others, that are of utmost importance to you. By all means send for it now; it is FREE.

The Standardized DUNTILE Plant Which Paves the Way to a Highly Successful Business for You

If it were not for the fact that everything entering into the making of DUNTILE has been standardized to the last possible degree, it would be far more difficult—and costly—to get started in this profitable business. As it is, the most highly developed of power equipment is scientifically arranged in a standardized building. Raw materials enter one end of the building and with least man power and no waste motion are turned out at the other end of the building, finished products. Naturally, this means quantity production, at a profit, from the start. Incidentally, the same equipment that has a capacity of 1500 to 2500 DUNTILE daily (depending on size) can be adapted in twenty minutes to making any size drain tile, conduit tile or silo tile. Investigate!

W. E. DUNN MANUFACTURING CO.

700 W. 23RD STREET

HOLLAND, MICHIGAN

DUNN POWER EQUIPMENT TRIPLE UTILITY

DUNN STANDARDIZED TILE PLANTS
COMPLETELY EQUIPPED FOR MANUFACTURING
BUILDING, DRAIN AND SILO TILE.

DUNN TILE MACHINES
DUNN SHOVEL MIXERS FOR PRODUCTS PLANTS
DUNN CONCRETE, MORTAR AND PLASTER MIXERS.

DUNN POWER EQUIPMENT TRIPLE UTILITY

BISHOPRIC STUCCO and Bishopric Base

provide an ideal interior and exterior wall for all time and clime

Bishopric Stucco

Tensile strength tests 1,150 lbs. to square inch

GUARANTEED

TO BE	NOT TO
Water-proof	Contract
Vermin-proof	Expand
Fire-proof	Disintegrate

Beautiful
Durable
Economical

Bishopric Base

Damp-proof
Fire-proof
Vermin-proof
Sound-deadening
Insulating

BISHOPRIC STUCCO is scientifically and completely prepared, ready for use and is shipped in air-tight metal drums (100 lbs. per drum), thus preserving the material in the warehouse and on the job until it is used, regardless of weather conditions, and provides against waste or deterioration.

These BISHOPRIC air-tight metal drums, attractively lithographed, provide most effective advertising value, denoting the superior quality of the product therein.

BISHOPRIC STUCCO is furnished in White, Pink, Buff, Cream, Gray or any special color one may desire.

BISHOPRIC STUCCO permits of any manner of finish, viz., stipple, spatter-dash, sponge, trowel or rough cast finish—therefore many harmonizing effects may be obtained.

Write for booklet, "For All Time and Clime." Beautifully illustrated—working details—specifications. Let us solve your building problems

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Volume 66 March, 1923 Number 3

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NATIONAL BUILDER

Volume 66 CHICAGO, MARCH, 1923 Number 3

Details of a Community Church

Third Congregational Church at Waterbury, Conn., Has Model Kitchen and Basement Auditorium

By F. J. and A. W. Trowbridge

THE congregation of the Third Congregational Church, Waterbury, Conn., was fortunate in having among its active and enthusiastic workers a very capable architect and his wife, both of whom have had quite extensive experience in church work. The results were, that when they came to have charge of the design and building of a church for their community they were able to incorporate many features, not usually thought of, for the convenience of those who use the church building as a community center.

The architect, Fred Jackson, has been one of the most active workers, as well as an officer of the parish, since the early period of its existence—about 1895—and the design of this building was more of a labor of love than a mere architectural commission. The new building replaces an old frame structure which had long failed to provide the necessary conveniences, so about every need which had arisen in his many years' connection with the parish was provided for in the new edifice—and at a minimum of cost.

The building is built in the English Gothic style, of common, hard burned, red brick, flush jointed with white mortar, and trimmed with "Art Stone" which has a marbleized, sand finish (made by Simbroco Stone Co., of Roxbury, Mass.); the main entrance steps are of gray cut granite; the foundation walls are local rubble stone laid in cement mortar; the parish hall and basement entrances are of portland cement concrete.

The roof is of slate, with snow guards; eave troughs and conductors are "Toncan metal."

All exposed steel work in beams, columns and girders is fireproofed by wrapping with expanded metal and plastering with 1:2 portland cement mortar, plus 10 per cent of hydrated lime.

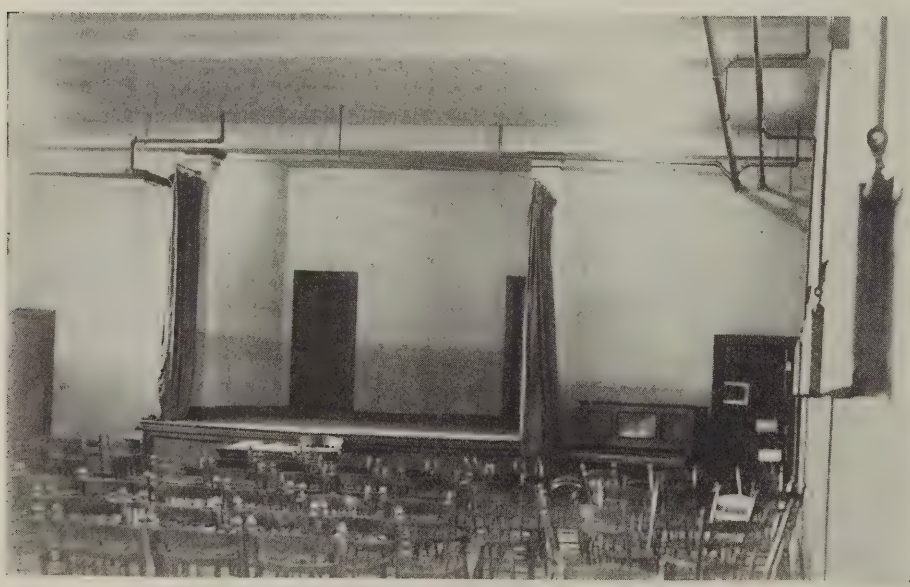
Main Auditorium

The main floor, in addition to the audi-

Third Congregational Church, Waterbury, Conn.; Fred Jackson, architect; Tracy Bros. Co., general contractors

Chancel of Third Congregational Church, Waterbury, Conn. (chestnut finish)

Choir loft and organ



Stage in basement—Sunday school room

torium and chancel, contains a pastor's room and a council room, on either side of the chancel, the pastor's room being provided with private outside entrance, convenient to the rectory which is next door to the church; also on either side of the main entrance are located retiring rooms for men and women, the inside walls of which form the front vestibule.

The finish floor is of rock maple, with deadening felt between that and the rough floor. The walls are plastered with portland cement plaster, sanded float finish, painted in two-tone buff, with dark brown stenciled border.

The ceiling is plaster, paneled between trusses, finished and painted the same as side walls. The roof trusses are of yellow pine, and with the trim, which is chestnut, are stained antique oak.

The bottom chord of the roof trusses is a false member, for architectural effect only, but it serves to hide the tension member, which is a tie rod boxed in as shown on the plans.

At the side wall and roof angle is a cove moulding, the base member of which is a standard picture mould, which is intended to be used for hanging the Christmas decorations of laurel and evergreen ropes, wreaths, etc., and for wedding decorations, saving the walls and trim from having nails driven into them.

The pews are plain ash, stained to match the trim, and provide a seating capacity of 234; the floor space allows for a small addition to this as necessity requires. They are spaced 2 ft. 9 in. apart, which gives more knee room than is ordinarily found in the older churches; this, with a well-shaped back, affords a very comfortable sitting position. The pews were built by the Manitowoc Seating Co., of Detroit, Mich.

The lighting of the auditorium is by electric bulbs, set in "X-Ray" reflectors, two in front of each truss, which places them out of view of the congregation. Capped wall outlets for future fixtures are located at intervals along side walls. Receptacles are provided at convenient places in baseboard for extra lighting, etc., such as Christmas tree lights, vacuum cleaner connections, etc.

The choir gallery has a seating capacity of 24, and in addition to the organ contains a robing and retiring room for the choir, and a closet for the organ motor and storage. It is wired for the use of high power stereopticon and moving picture machine circuits, in connection with which a curtain rod, for hanging the picture screen, is installed on the front of the bottom chord member of the roof truss just in front of the chancel.

All windows in the body of church are center pivoted, allowing full sash opening and maximum ventilation. Large leaded glass windows in front elevation have steel reinforced came-bars. The glazing is in moss-figured glass.

Kitchen in basement of church

Sunday school room in basement

Trusses in roof of main part of church

General view of main floor and chancel

Parish Hall

The main feature of the lower floor is the "Parish Hall," which is 36x46x15 ft., clear height, with a seating capacity of 300. The finish is of the same materials and colors as the auditorium above, the finish floor (rock maple) running through under the stage, provides storage space for extra seats, tables (knock-down), scenery, etc.; access to this space is through removable panels in front of stage.

This floor is below the outside grade and is laid on a 5-in. portland cement concrete base, on which are laid 2x3-in. beveled screeds 16 in. on centers, filled between with cinder concrete. The top of this underfloor was then given a thick coating of hot pitch before the finish floor was laid.

On either side of the stage are good sized rooms, containing toilet facilities for men and women, and connecting with the stage by an intercommunicating passage across the rear; and with the stairway to main floor this allows for the retiring rooms near the main entrance to be used as dressing rooms for amateur theatricals, if necessary.

The lighting of the hall is by electric bulbs in screened "X-Ray" reflectors at the ceiling. The stage is provided with proscenium lights and receptacles for portable footlight connections.

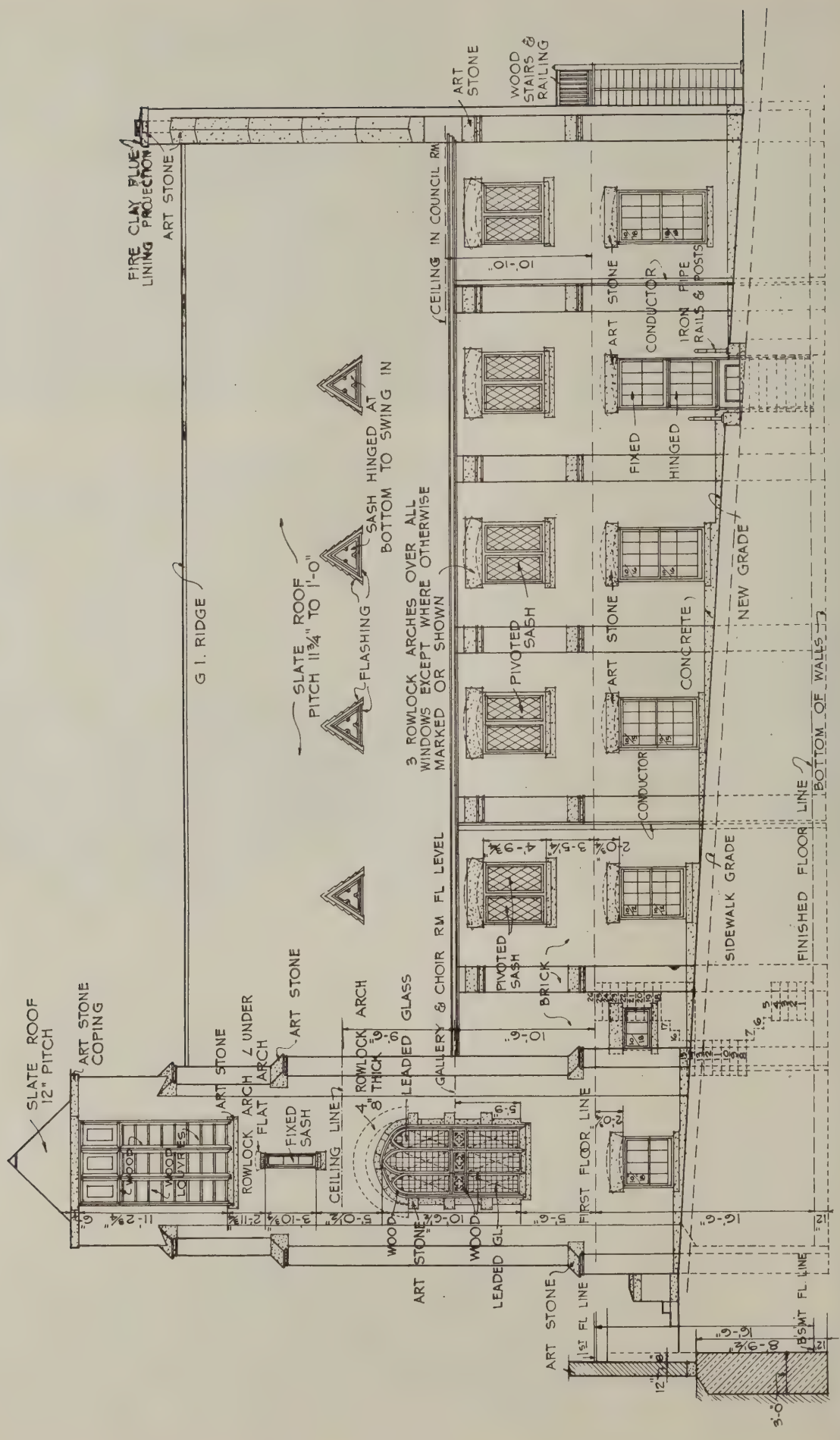
Along the base of the front of stage are three receptacles for sewing-machine motor connections, and a number of receptacles are located in other parts of the hall for various purposes. The receptacles for stereopticon and moving picture machines are located in the kitchen adjacent to the serving counter opening, where it is intended to operate the machines entirely out of the way of the audience.

Kitchen

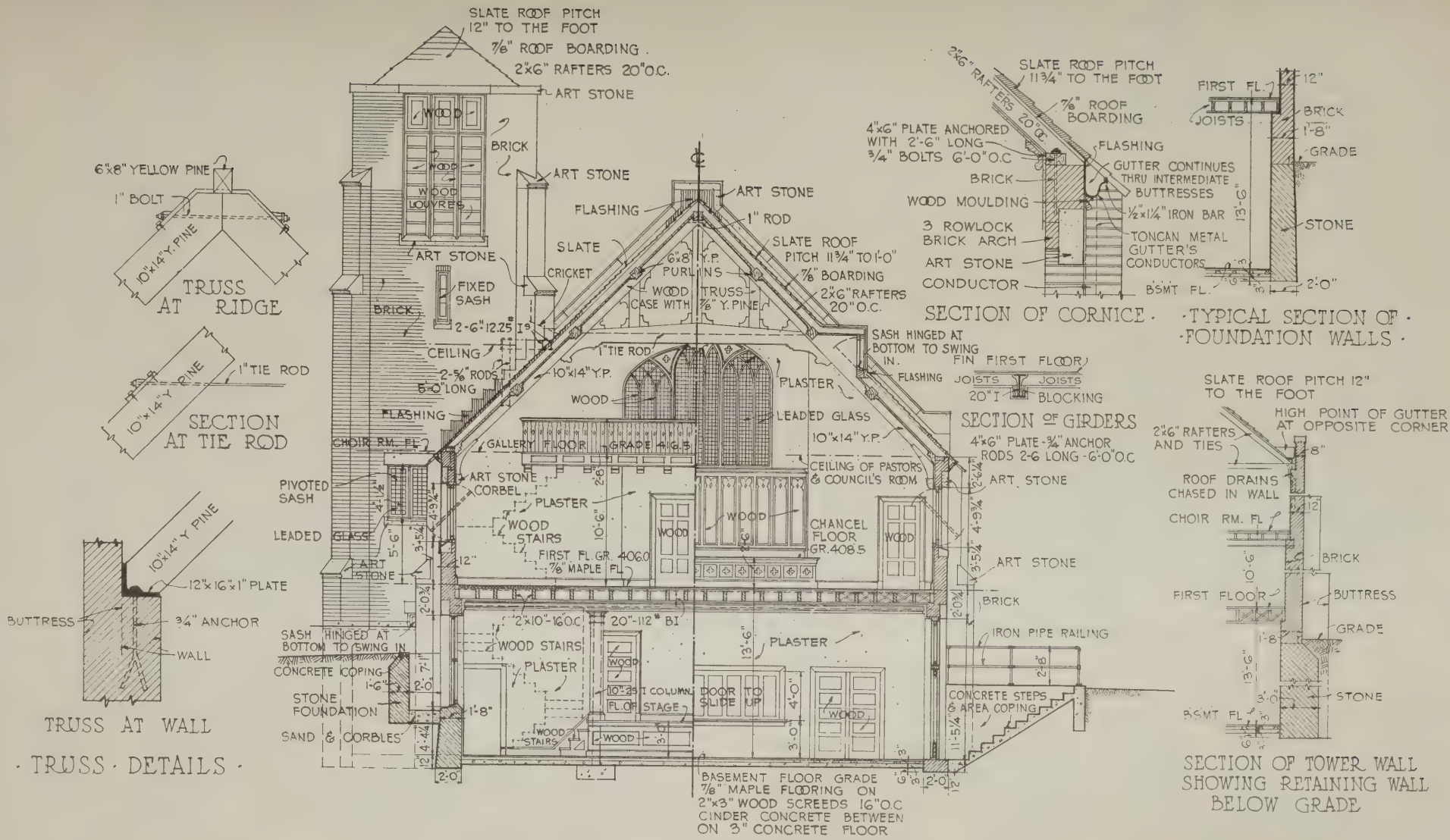
The kitchen is located at the opposite end of the parish hall from the stage and is connected with the hall by two single swing doors, to prevent waiters' interference. The ceiling is 15 ft. high and with windows set high in the side walls, gives good ventilation to outside air.

The kitchen has two large built-in china closets, and the sink, with a large drip board at each end, is long enough to accommodate two dish-washing crews. The very long shelf between the rooms is a great convenience and time-saver in serving dinners and suppers and entirely eliminates the confusion of the waitresses' entering the kitchen. All possibility of collisions is avoided in any necessary passing between the rooms by the clever arrangement of the double door, each half of which swings but one way.

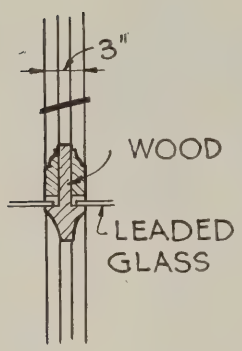
The serving counter opens into the hall by a section of rising paneled partition. An 18-in. supply shelf is located under the counter. The sink is "Alberene" stone with double drain boards. Hot water is provided by a No. 32 "Kompak" automatic gas water heater and storage tank of 60-gal. capacity. Thermostat control keeps water in tank at 212 deg. F. when once started and the tank is equipped with a safety valve and blow-off into the chimney for emergency. The balance of the equipment is a



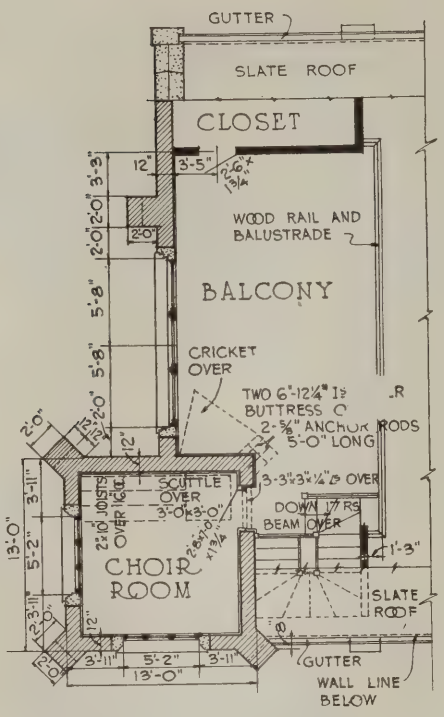
Side elevation of the Third Congregational Church at Waterbury, Conn., showing details of construction

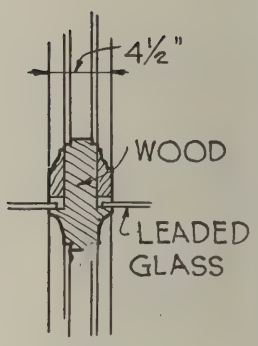


Section through Third Congregational Church, Waterbury, Conn., and various construction details



·DETAIL · OF ·
·SMALL · MUNTIN·





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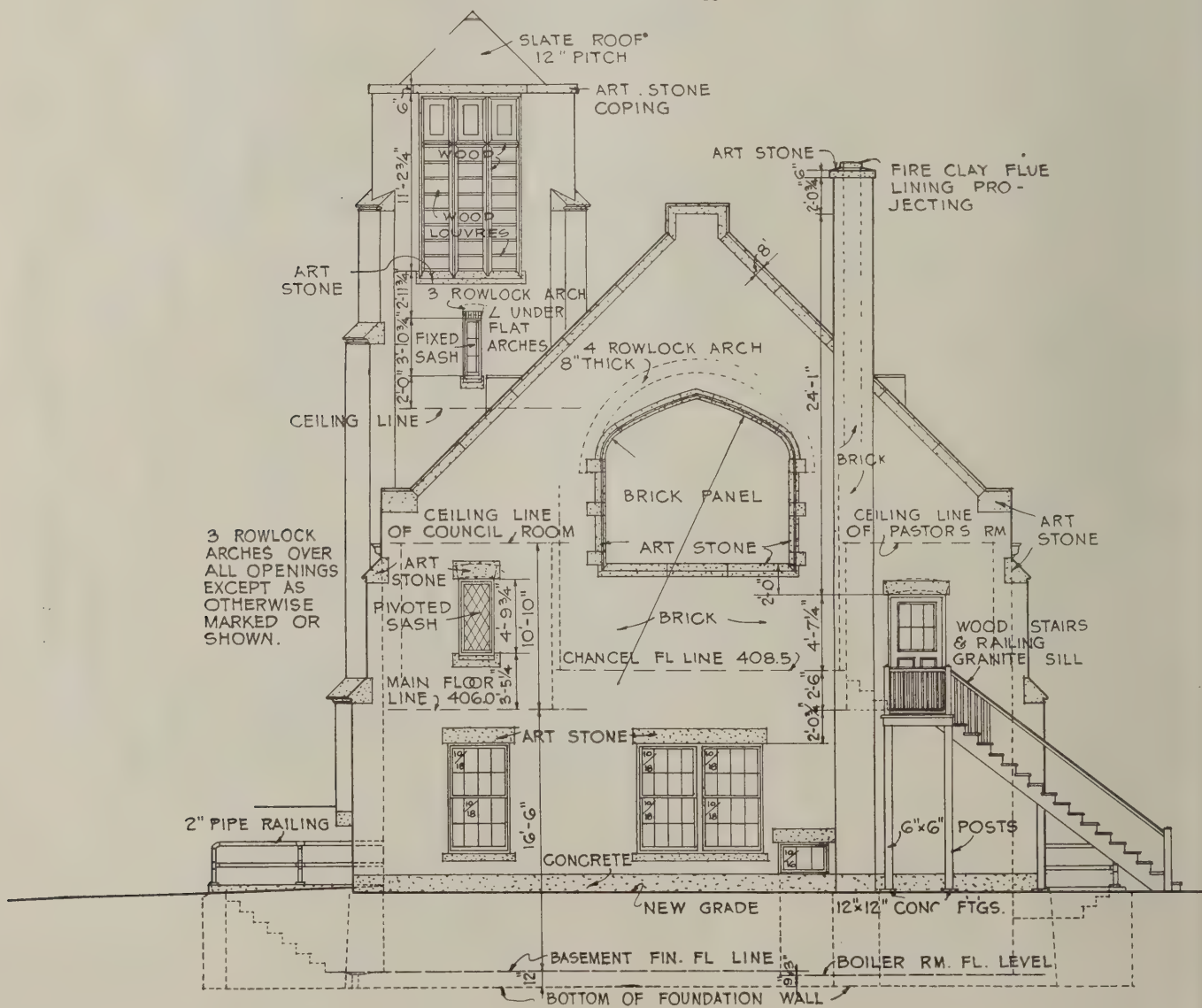
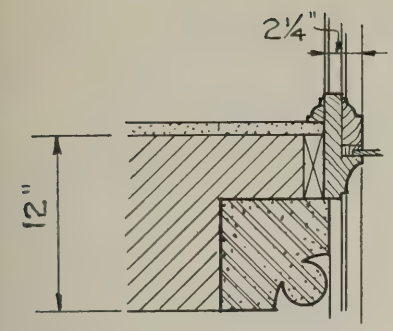
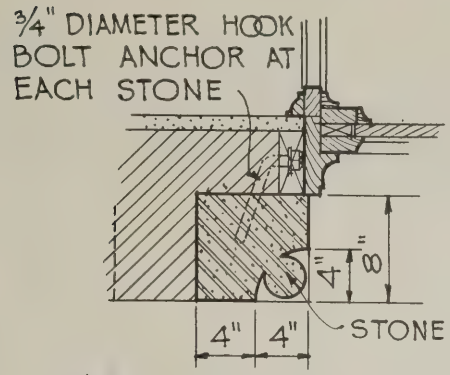


REAR - ELEVATION -

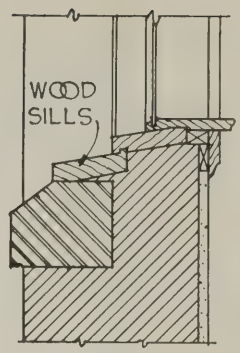
Rear elevation of Third Congregational Church, Waterbury, Conn., and various construction details



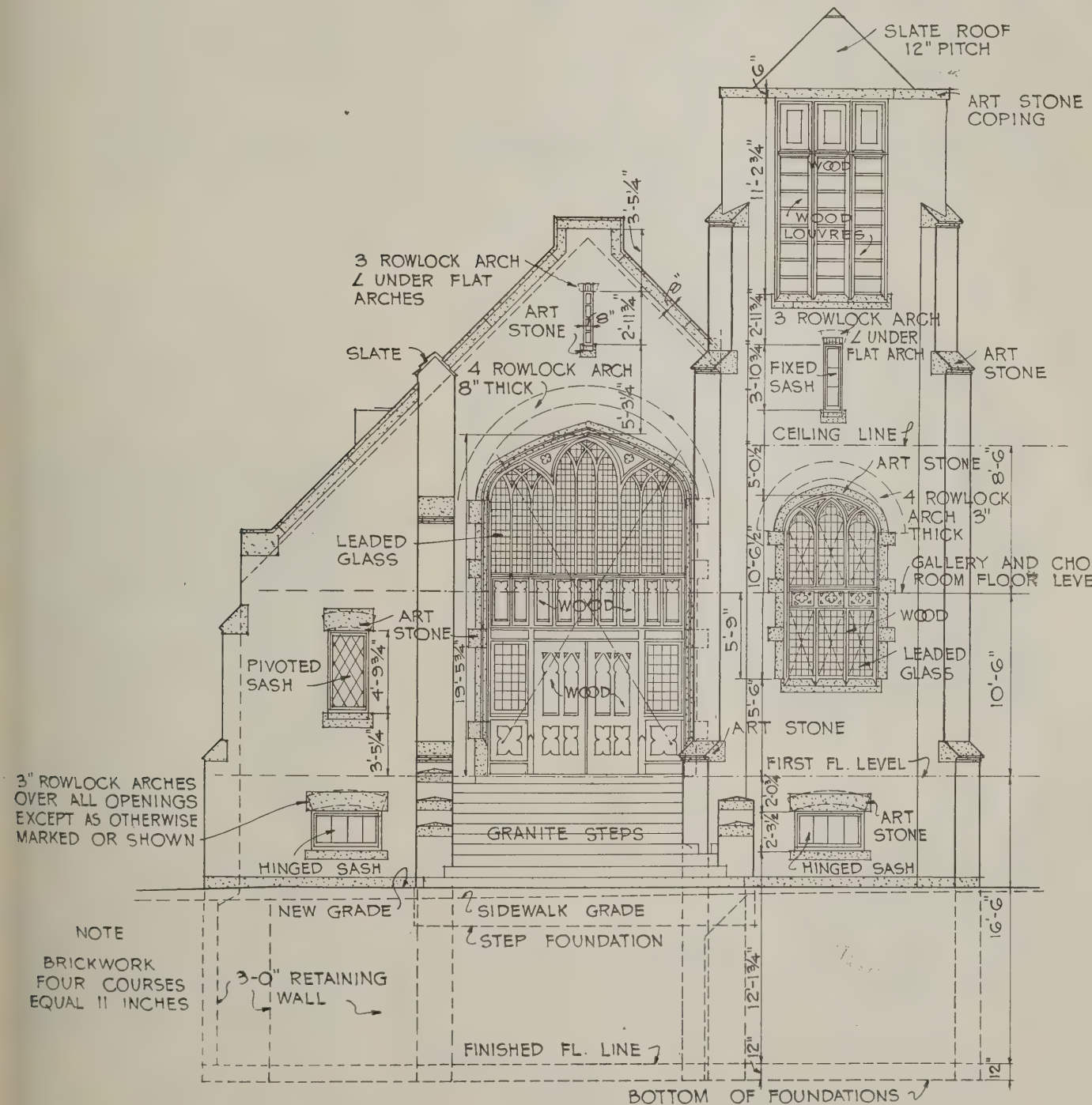
· JAMB · SECTION ·
· AT · GLASS ·



· JAMB · SECTION ·
· AT · WOOD · PANEL ·

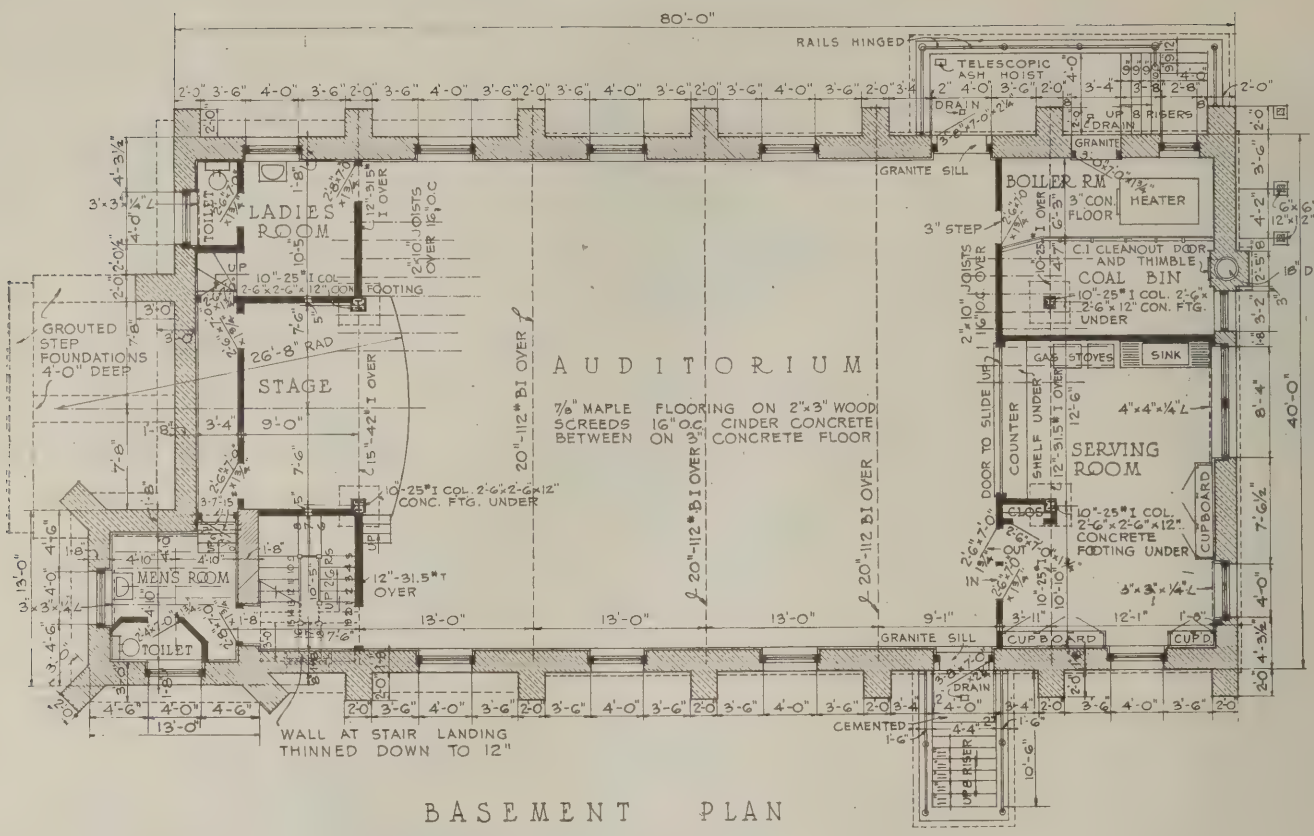


· SILL · SECTION ·
· QUOIR · ROOM · WINDOW ·

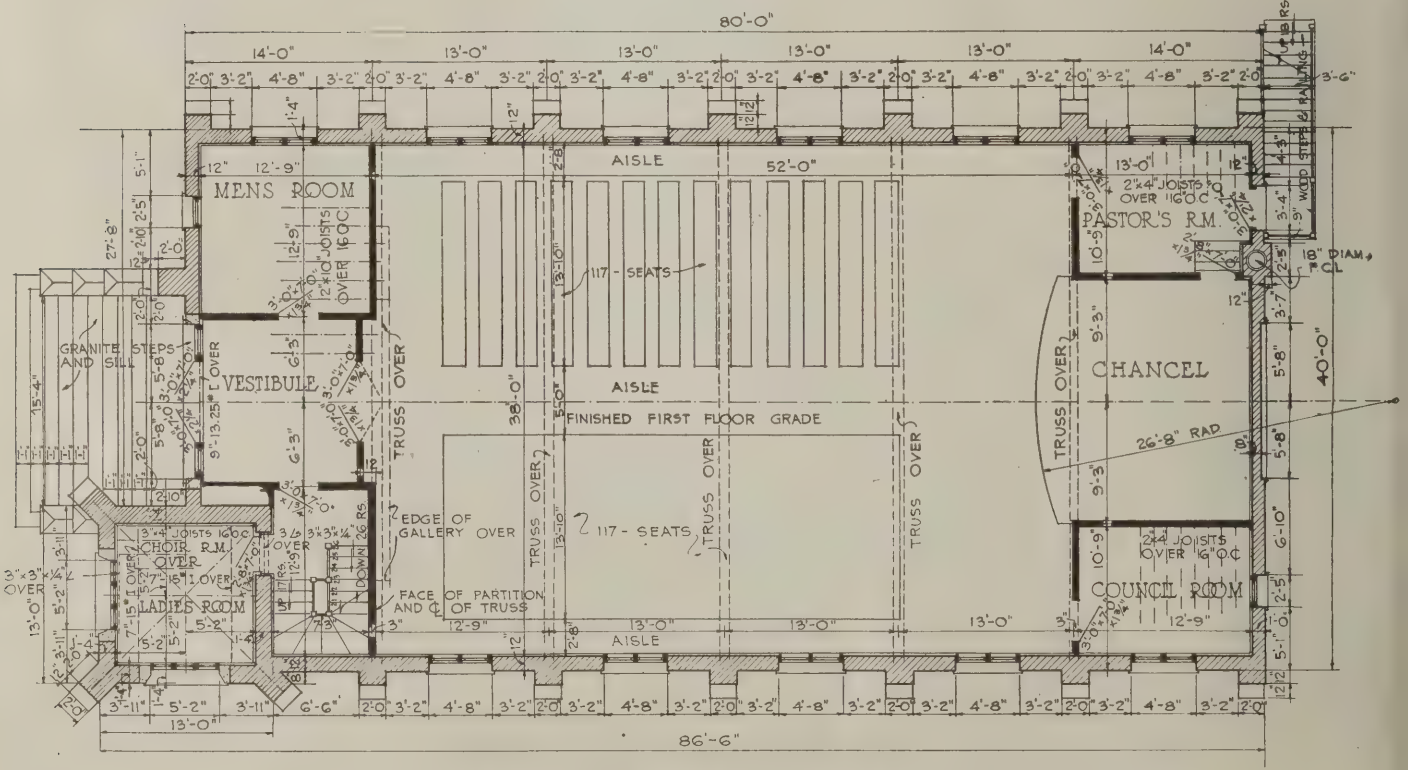


HIGHLAND · AVENUE · ELEVATION ·

Front elevation of Third Congregational Church, Waterbury, Conn., and construction details



Plan of the basement floor of the Third Congregational Church, Waterbury, Conn.



Plan of main floor of the Third Congregational Church, Waterbury, Conn.

gas stove and built-in cupboards with sash doors and locks on two sides of the room.

Heating

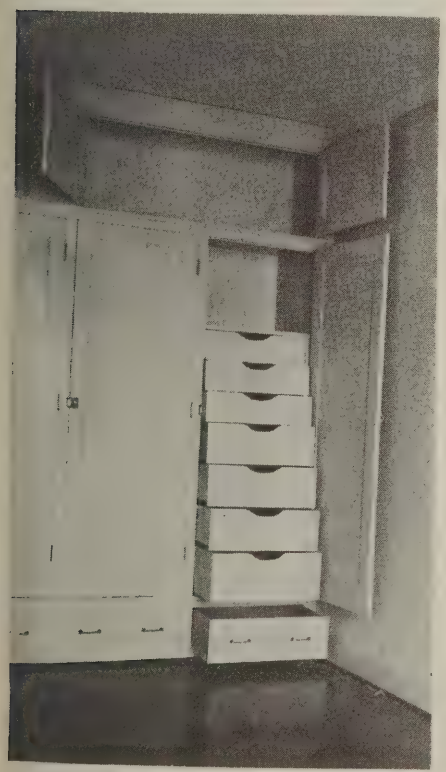
The boiler room is located adjacent to kitchen in the rear of parish hall, and is equipped with a battery of two Pierce, Butler & Pierce down-draft steam boilers, one No. 846 for mild weather and one No. 849 for cold weather, with provision for coupling together for extreme cold weather. Radiators are of the "Princess" pattern, hung on wall brackets. A mechanical ash lift is installed at the boiler room basement entrance to facilitate the removal of ashes and waste.

Cost

The following table gives an itemized cost of the principal features in connection with the building and its fixtures and mechanical equipment:

Church, including heating, painting and plumbing	$66,400
Pews	1,600
Electrical work	1,200
Lot	2,200
Total	$71,400

Construction work was started September, 1920, and completed March, 1921. The architect, as already mentioned, was Fred Jackson, 282 Highland avenue, Waterbury, Conn., and the general contractors, the Tracy Brothers Co., Waterbury, Conn.



Right-hand section of clothes cabinet—one of the many devices in the new Hollywood-Kenmore Apartments, Chicago, to save both space and furniture

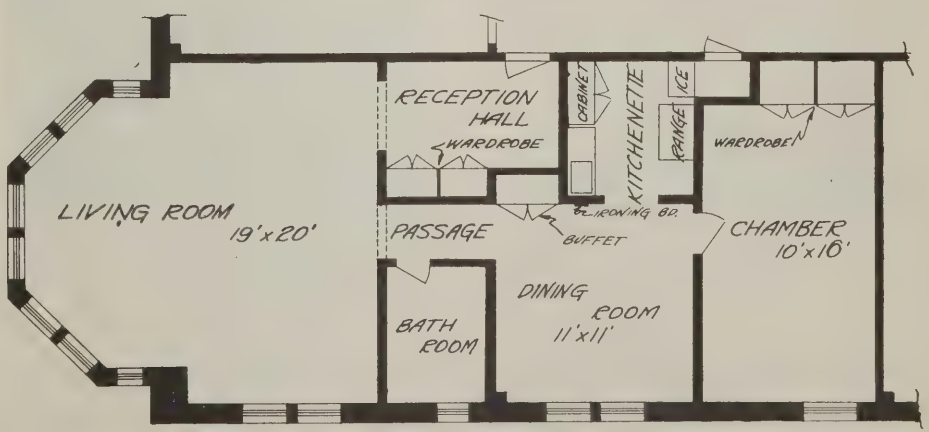
Last Word in Space-Economizing City Apartments

New Building in Chicago Where Four Rooms Bring $200 Per Month Rentals

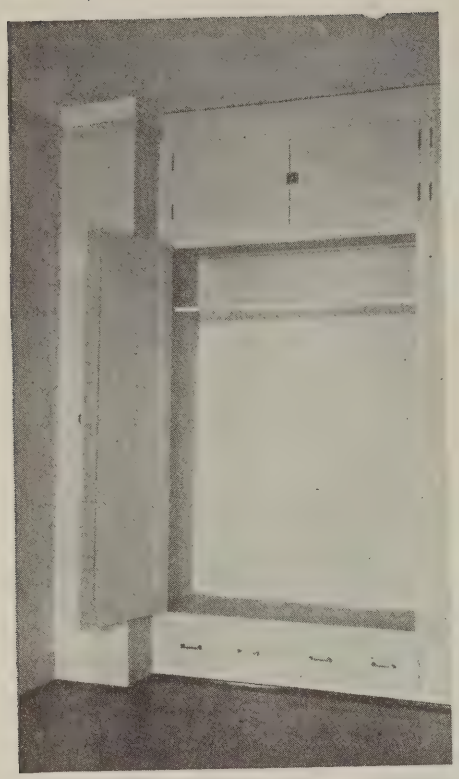
IN the modern apartment building, constructed where real estate values are high, utilization of floor space is the prime factor in planning. Where rentals are calculated on the basis of the square foot of floor area, wasted space means money lost, and space devoted to some useful purpose means added income. With this idea in mind, the architects of the nine-story Hollywood-Kenmore apartments in Chicago aimed for the elimination of space waste and hit upon the scheme of making the kitchens small, substituting cabinets for closets and pantries, and giving over the space thus saved to increasing the size of the living-rooms and chambers. The floor plan shown here is the northeast corner apartment on the ninth floor, which rents for $205 per month.

A study of the floor plan will show the arrangement of the various wardrobes and cabinets and the layout of the kitchen. The chamber wardrobe occupies the entire south chamber wall and is divided into

Hollywood-Kenmore Apartments, Chicago



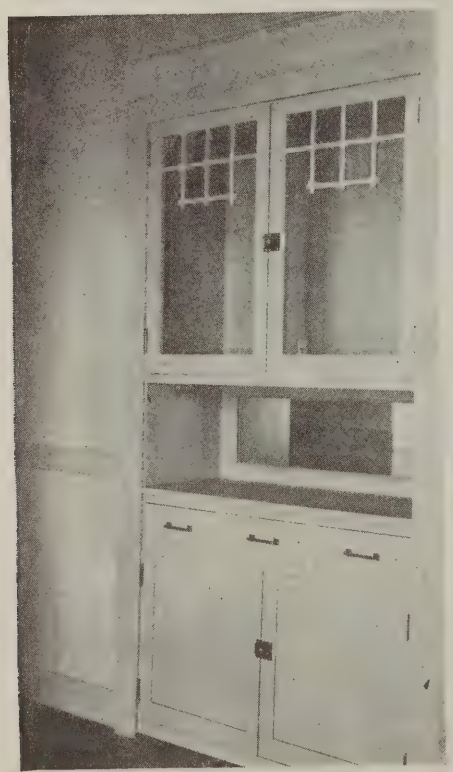
Floor plan of corner apartment on ninth floor



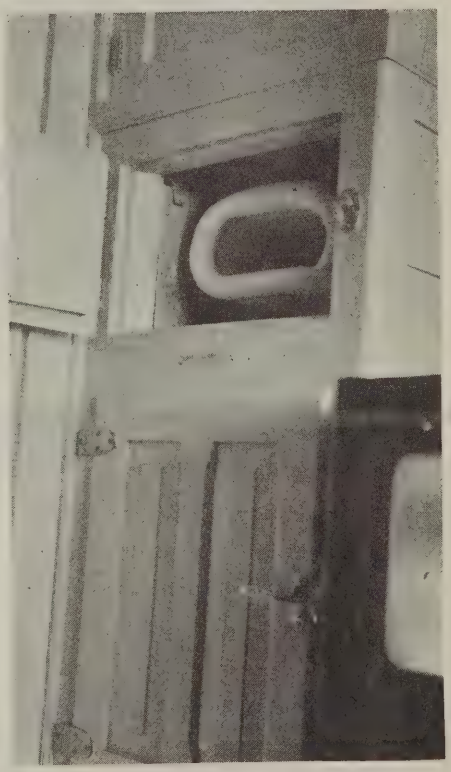
Left-hand section of clothes cabinet in chamber

View of kitchen cabinet showing drawer arrangement

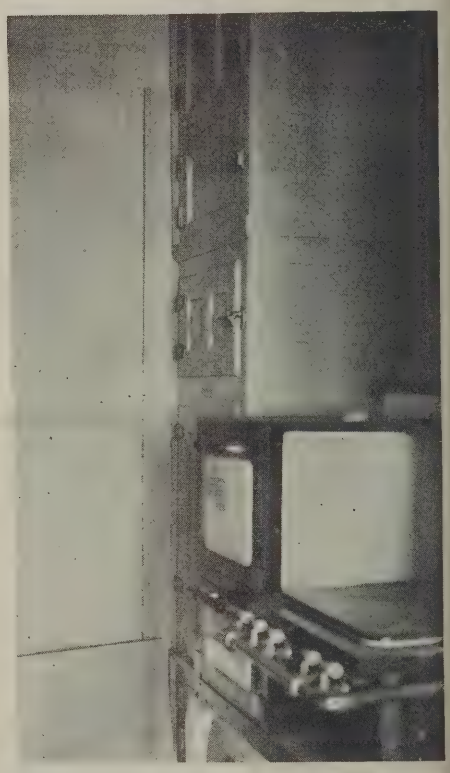
View showing kitchen cabinet and refrigerator arrangement



Dining room buffet



View showing brine coils in refrigerator



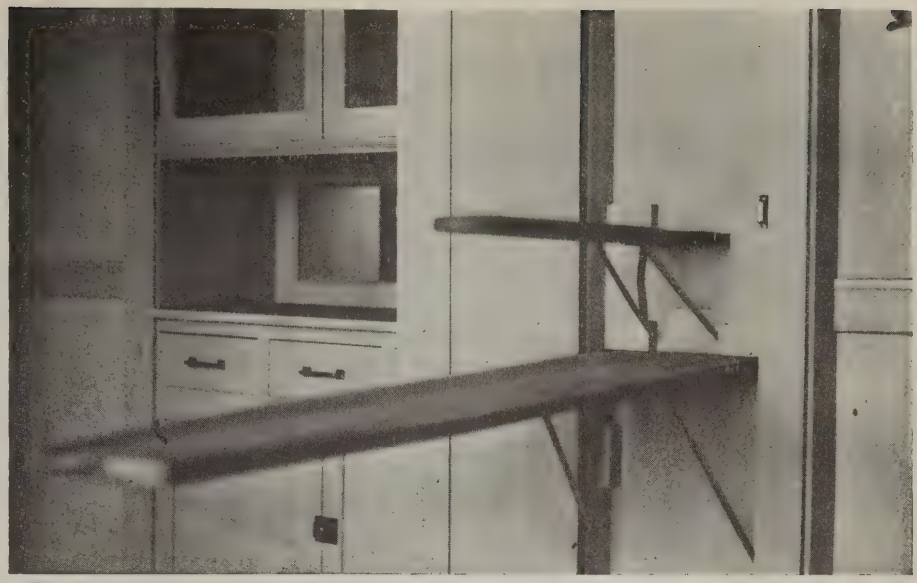
View showing location of range

Space-Saving and Up-to-the-Minute Conveniences in the New Hollywood-Kenmore Apartments, Chicago, Ill. B. Leo. Steif & Co., Architects; G. M. Posner and Co., General Contractors, Chicago

compartments, as shown in the illustrations. The kitchen layout is designed not only for conservation of space but also for convenience in the preparation of food.

A kitchen cabinet and a series of closets above and below the refrigerator take the place of a pantry. The lowest compartment of the refrigerator is a package receiver and packages may be delivered from the outside through a door in the rear. Refrigerators are cooled by means of brine coils which operate from a central plant in the building. Another convenience is the collapsible ironing-board built directly into the dining room partition, shown in the accompanying illustration.

The architects for the building were B. Leo Steif and Co., and the general contractors were G. M. Posner and Co., of Chicago, Ill.



Ironing board opening in the dining room

National Builder's House Plans for This Month

THIS month's designs for NATIONAL BUILDER by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc., illustrate the possibilities of different effects with basic plans. House No. 5A53, for example, has the same basic floor plan as House No. 5A50, published in the January issue of NATIONAL BUILDER, but this month's house is of frame construction, with a shingled exterior, in place of hollow tile (or concrete block) and stucco. Likewise, House No. 5A52 is very similar to House No. 5A27 in the February issue of NATIONAL BUILDER, being slightly larger, thus providing for a "dining room" instead of a "dining alcove."

Readers are urged to study these various designs in comparison with one another for the ideas they suggest in adapting any and all the various designs for particular purposes. If the house plans shown do not meet with your particular needs, but the general arrangement of the rooms is what you want, let us hear from you. If you like a particular elevation, but the room layout is not what you want, or the rooms are too small, let us hear from you.

Both NATIONAL BUILDER and The Architects' Small House Service Bureau are anxious to meet the needs of practical builders, as well as the requirements of good house architecture. We welcome suggestions and constructive criticism. The bureau is equipped to make alterations in the plans to suit the needs of the purchaser, and to preserve at the same time the beauty and distinction of the design.

PRIZE OFFER!

REFER to your January issue of National Builder, page 60, for the details of a prize offer of $525 in ve separate prizes—$250, $125 and three at $50 each—for the best articles by subscribers on how you are using The Architects' Small House Service Bureau plans in your work.

Remember we are after hard-boiled facts; you don't have to be a writer; all you have to be is a live-wire builder, contractor or dealer. Are you merchandising houses through the use of these National Builder designs? If you are, how and with what success? Let's hear all the details.

Nathan C. Rockwood

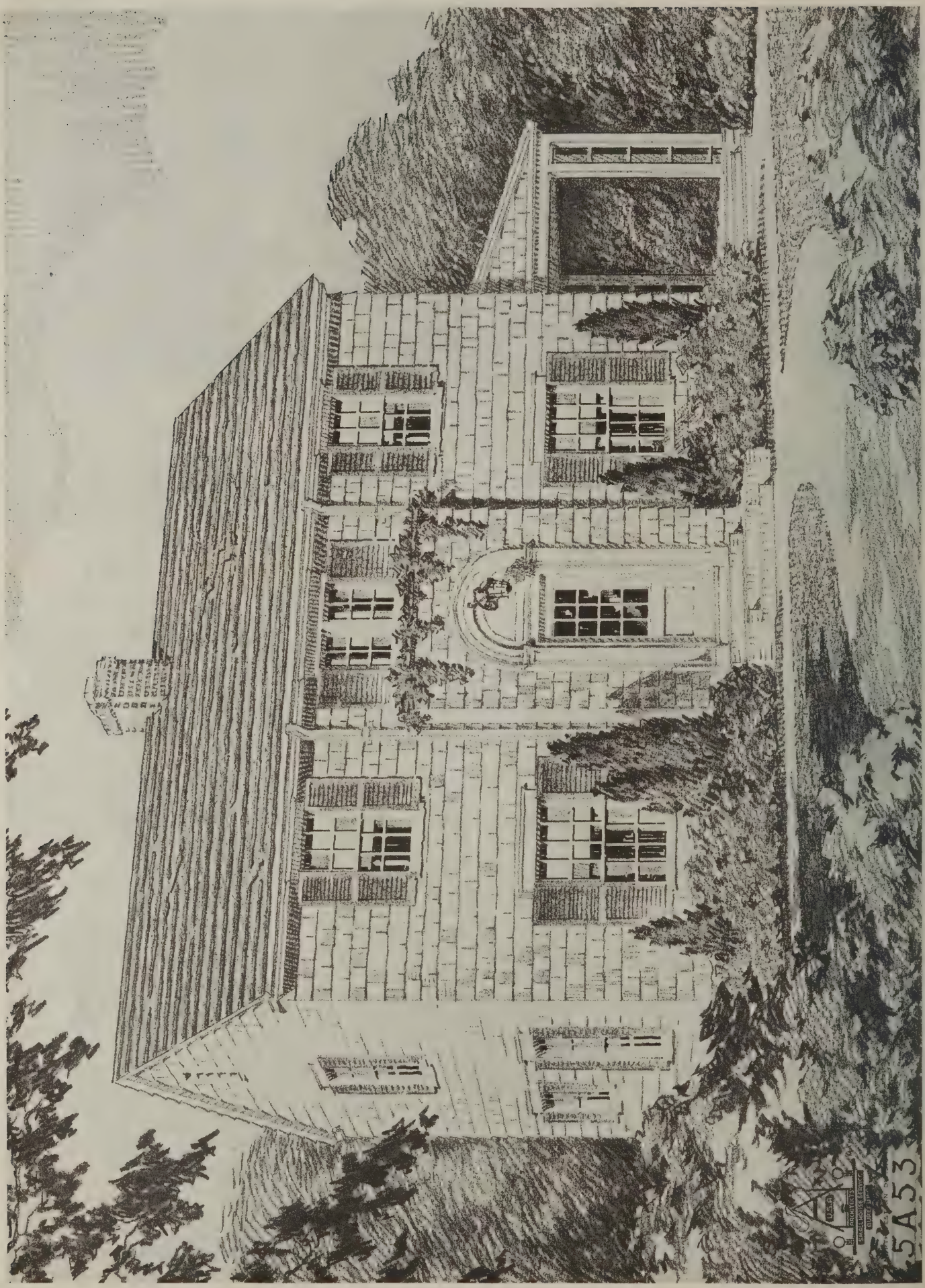
Editor, National Builder.
Chicago, Ill., Feb. 23, 1923.

"Every day in every way" prestige is being added to the house designs of The Architects' Small House Service Bureau. The March issue of *Good Housekeeping*, for example, contains an article by Maurice I. Flagg, director of service of the bureau, on the work the bureau is doing. Every week more and more of the big daily newspapers are taking on the "Home Builders' Clinic" service. The live-wire builder and contractor should capitalize all this publicity and prestige—many of them are doing so. From those who are we want to hear about some of the results they are getting. Some one in your organization can win a $250 prize by a simple statement of how you are merchandising these plans—these houses. If they do not come up to your needs, or your expectations, it is for you to say. Many letters of commendation have already been received. What are your suggestions or criticisms?

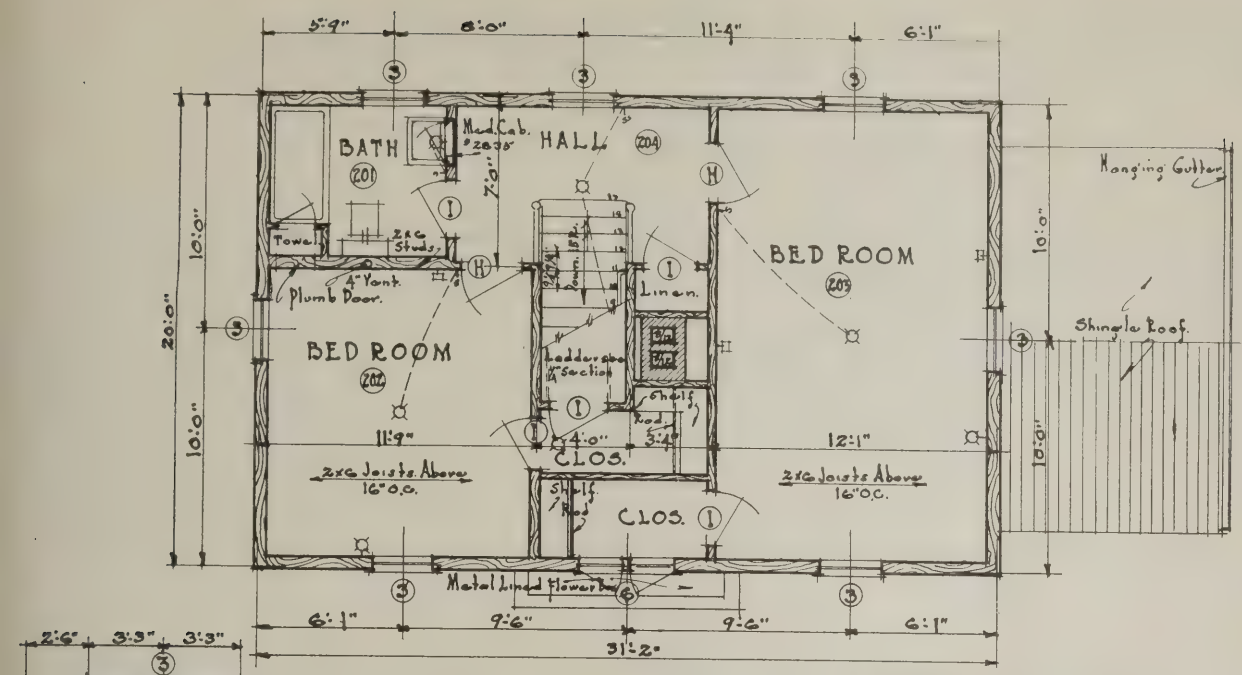
Complete plans, bills of material and contract forms for any of the houses shown in this and preceding issues of NATIONAL BUILDER are sold for one-half the list price to bona fide subscribers of NATIONAL BUILDER.

MATERIALS		ELECTRIC WIRING SYMBOLS			
CONCRETE		CEILING OUTLET		3 WAY SWITCH	
BRICK		DROP CORD		GAS OUTLET	
WOOD		BRACKET		PUSH BUTTON	
PLASTER		BASE PLUG		BELL OUTLET	
TILE		SWITCH		BUZZER	

This chart shows symbols used in all the plans of The Architects' Small House Service Bureau

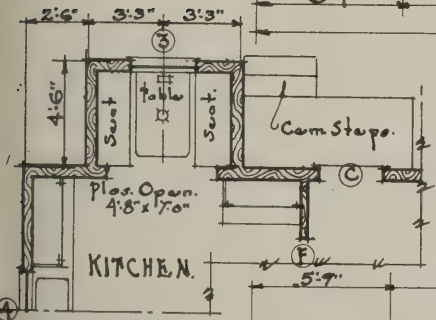


Designed by The Northwestern division of The Architects' Small House Service Bureau of the United States, Inc., especially for National Builder. Full construction



SECOND FLOOR PLAN

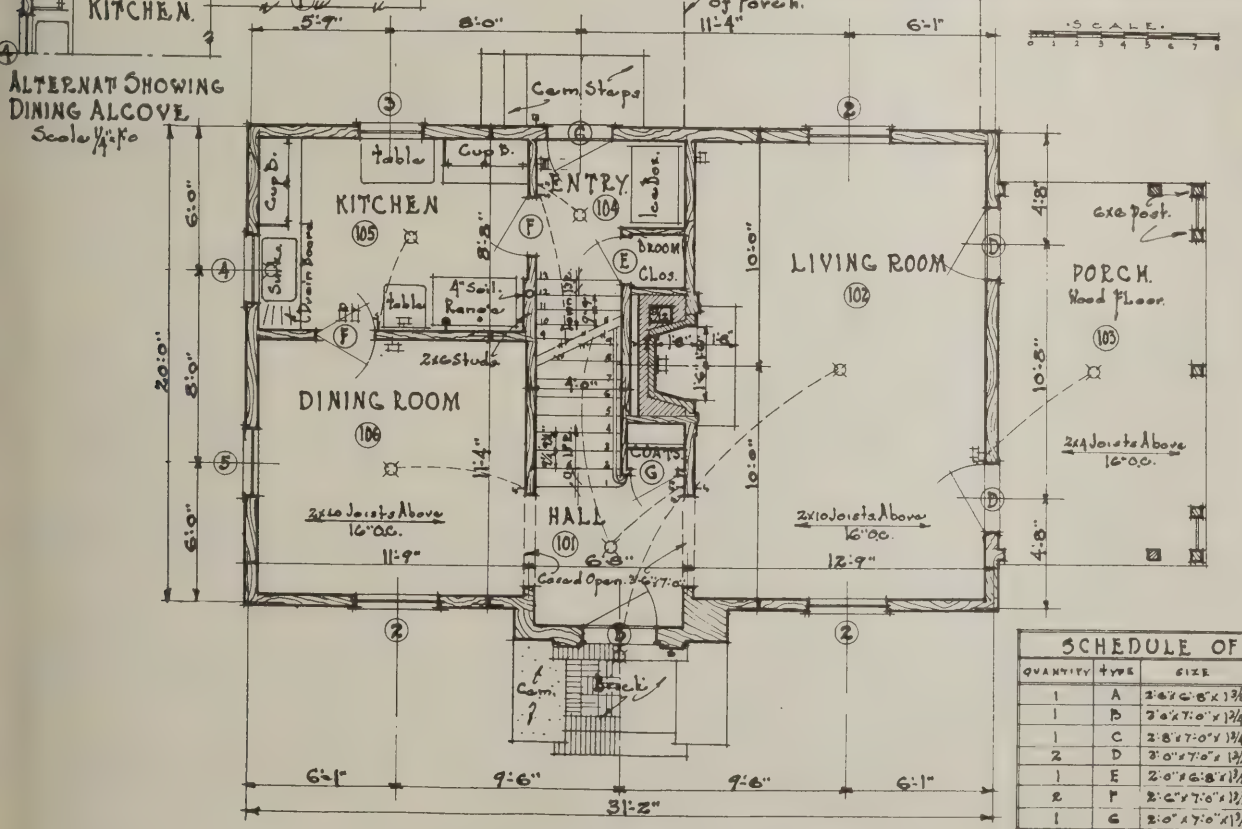
Scale 1/4"=1'-0"



ALTERNATE SHOWING DINING ALCOVE

Scale 1/4"=1'-0

SCHEDULE OF WINDOWS							
QUANTITY	TYPE	DESCRIPTION	No. OF LIGHTS	SIZE GLASS.	SIZE OF OPNG. FOR SASH	THICKNESS SASH	FRAME
5	1	Basement	3	8 x 10	2'-4" x 1'-3"	1 3/8"	See Detail
3	2	Double Hung	16	10 x 14	2'-8 3/4" x 5'-2"	"	"
8	3	" "	12	9 x 12	2'-7 1/2 x 4'-6"	"	"
1	4	" "	6	10 x 16	2'-10 1/2" x 3'-2	"	"
1	5"	" "	12	10 x 14	2'-10 1/2" x 5'-2	"	"
2	6	Casement	4	10 x 16	2'-1" x 3'-1"	"	"



FIRST FLOOR PLAN

SCHEDULE OF DOORS				
QUANTITY	TYPE	SIZE	DESCRIPTION	REMARKS
1	A	2'-6" x 6'-8" x 1 3/8	UNIV. # 720	5 Panel
1	B	3'-0" x 7'-0" x 1 3/4"	See Elev.	Glazed With DS
1	C	2'-8" x 7'-0" x 1 3/4"	Univ. # 753	Rear.
2	D	3'-0" x 7'-0" x 1 3/4"	" #1605	Porch.
1	E	2'-0" x 6'-8" x 1 3/8	" #1102	Interior.
2	F	2'-6" x 7'-0" x 1 3/8"	" "	"
1	G	2'-0" x 7'-0" x 1 3/8	" "	"
2	H	2'-6" x 6'-8" x 1 3/8	" "	"
5"	I	2'-4" x 6'-8" x 1 3/8	" "	"

Floor plans of House No. 5A53, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc. Copyrighted by National Builder and The Architects' Small House Service Bureau

Five-Room Colonial House No. 5A53

THE charm of this design—its delightful, home-like quality—does not depend upon expensive materials or detail, but upon its good proportions, nice spacing of doors and windows, and the happy use of the arched colonial entrance. While this home is architecturally good, it has been designed so the builder should find it very inexpensive to build.

It is of frame construction with exterior finish of 24-in. shingles laid 8 in. to the weather. There is a concrete base, which might be brick if the owner desires, brick steps and stoop and shingle roof. Stucco or siding could be substituted for the exterior finish and make an equally attractive exterior.

This house will require a 50-ft. lot if the porch is built at the side, as shown in the illustration. If the porch is omitted or placed at the rear it can be built on a 40-ft. frontage. It can even be swung around and faced to the side so as to be built upon a 35-ft. lot.

This is an especially economical plan as it gets five good-sized rooms into a limited space without any waste in halls. The plan belongs to the popular center stairway type with a living room running the depth of the house.

There is a complete basement. On the second floor there are two comfortable bedrooms with conveniently placed bath. Ample provision has been made for closets and storage room.

This house is designed to face west or north. Reversed plans for other facings are furnished without extra charge.

The regular price for this plan is $25 ($12.50 to NATIONAL BUILDER subscribers.

EXCAVATING—152 cu. yd.

BACKFILL—28 cu. yd.

FOUNDATION—If 12-in. concrete, 45 cu. yd. gravel, 182 sax cement; if 9-in. concrete, 40 cu. yd. gravel, 162 sax cement; if 12-in. tile, 21000 CBM tile, 16 cu. yd. mortar; if 9-in. tile, 18000 CBM tile, 13 cu. yd. mortar; 200 face brick for steps.

CEMENT FLOOR—4 cu. yd. gravel; 4 cu. yd. sand; 50 sax cement; 14 lin. ft. cement steps; 4 cement spatter blocks.

CHIMNEY—2800 common brick; 240 face brick; 100 fire brick; 26 sq. ft. hearth tile; 180 inside face brick; 60 lin. ft. flue tile 8 x 12; 20 lb. fire clay; 3 cu. yd. mortar; 1 C.-I. ash dump; 1 throat and damper; 1 angle 4 x 3 x 5/16; 2—8 x 12 cleanouts; 2 adjustable thimbles; 6 sq. yd. metal lath.

LATH—8000 lath.

PLASTER—17 sq. yd. stucco on cement; 570 sq. yd. plaster on wood lath; 9 sq. yd. plaster on metal lath; 14 sq. yd. Keene's cement.

TILE FLOORS—40 sq. ft. ceramic tile; 25 lin. ft. cove base.

LUMBER—5—6 x 6-7 posts; 1—6 x 10-7 girders; 1—6 x 10-8 girder; 1—6x10-20 girder; 2—2 x 4-7 girders ribbon; 2—2 x 4-8 girders ribbon; 2—2 x 4-20 girders ribbon; 4—2 x 4-14 stair horses; 4 ft. 2 in. plank cleanout cover; 2—2 x 4-18 basement partition plates; 15—2 x 4-7 basement partition shtg.; 13—2 x 6-9 porch joists; 2—2 x 6-16 porch joist headers; 16—2 x 10-14 first floor joist; 16—2 x 10-18 first floor joists; 4—2 x 10-10 box sill; 3—2 x 10-14 headers; 4—2 x 6-14 headers and platform; 200 lin. ft. 1 x 3 bridging; 180 ft. 4 in. edge grain flooring porch; 180 ft. ⅝ x 4 ceiling porch; 650 ft. boards, first floor subfloor; 800 ft. 13/16 x 1½ first floor finish floor; 2—2 x 8-16 porch girders; 4—2 x 8-9 porch girders; 13—2 x 4-9 porch ceiling joist; 303 lin. ft. 2 x 4 outside wall plates; 13—2 x 4-10 porch rafters; 84—2 x 4-18 outside wall studs; 8—2 x 4-16 outside wall gable studs; 3—2 x 4-12 outside porch gable studs; 40 lin. ft. 1 x 4 ribbon; 13—2 x 4-10 porch rafters; 20—2 x 4-14 opening doubles and headers; 4—2 x 4-16 stair horses; 16—2 x 10-14 second floor joist; 16—2 x 10-7 second floor joist; 16—2 x 10-12 second floor joist; 4—2 x 10-14 headers and doubles; 640 ft. com. bds. second floor subfloor; 195 lin. ft. 2 x 4 first floor partition plates; 58—2 x 4-9 first floor partition studs; 210 lin. ft. 2 x 4 second floor partition plates; 62—2 x 4-8 second floor partition studs; 32—2 x 6-12 second floor ceiling joist; 16—2 x 6-8 second floor ceiling joist; 32 lin. ft. 1 x 6 ribbon rafters; 50—2 x 4-14 rafters; 25—2 x 4-12 lookouts; 25—2 x 4-6 collar ties; 2100 ft. shiplap outside wall sheathing; 8 M shingles outside wall sheathing; 1300 ft. bds. roof sheathing; 9 M shingles for roof; 20—2 x 4-16 extras and headers; 4—2 x 6-14 extras and headers; 10—2 x 2-20 scaffold; 3—2 x 8-16 scaffold; 4—2 x 10-18 scaffold; 4—2 x 12-16 scaffold; 1100 lin. ft. grounds; 740 ft. 13/16 x 1½ second floor finish floor.

MILLWORK—Frames: 3 single frames 8 x 10-3L-1⅜; 1 mul. frame 8 x 10-3L-1⅜; 3 single frames 10 x 12-16L-1⅜; 8 single frames 9 x 12-12L-1⅜; 1 single frame 10 x 16-6L-1⅜; 1 single frame 10 x 14-12L-1⅜; 1 double casement frame 10 x 16-6L-1⅜; 2 louvre frames, complete. **Windows:** 5 sash 8 x 10-3L-1⅜; 3 windows 10 x 14-16L-1⅜; 8 windows 9 x 12-12L-1⅜; 1 window 10 x 16-6L-1⅜; 1 window 10 x 14-12L-1⅜; 2 casements 10 x 16-6L-1⅜. **Storm Sash:** 5—8 x 10-3L-1⅛; 3—10 x 14-16-1⅛; 8—9 x 12-12L-1⅛; 1—10 x 16-6L-1⅛; 1—10 x 14-12L-1⅛; 2—10 x 16-6L-1⅛. **Screens:** 5—8 x 10-3L-1⅛; 3—10 x 14-16L-1⅛; 8—9 x 12-12L-1⅛; 1—10 x 16-6L-1⅛; 1—10 x 14-12L-1⅛; 2—10 x 16-6L-1⅛. **Shutters:** 3 pr. for 10 x 14-16L; 7 pr. for 9 x 12-12L; 1 pr. for 10 x 16-6L; 1 pr. for 10 x 14-12L; 2 single shutters for 10 x 16-6L. **Outside Door Frames:** 1—3 ft. 6 in. x 7 ft.-1¾; 1—2 ft. 8 in. x 7 ft.-1¾; 2—3 ft. x 7 ft.-1¾. **Outside Doors:** 1—3 ft. 6 in. x 7 ft.-1¾; 1—2 ft. 8 in. x 7 ft.-1¾, No. 753; 2—3 ft. x 7 ft.-1¾, No. 1605. **Storm Doors:** 1—3 ft. 6 in. x 7 ft.-1⅛; 1—2 ft. 8 in. x 7 ft.-1⅛; 2—3 ft. x 7 ft.-1⅛. **Screen Doors:** 1—3 ft. 6 in. x 7 ft.-1⅛; 1—2 ft. 8 in. x 7 ft.-1⅛; 2—3 ft. x 7 ft.-1⅛. **Exterior Millwork: 12 lin. ft.** main entrance cornice; 1 special entrance trim; 160 lin. ft. cornice; 1 flower box 8 ft.; 5 porch posts; 4 lattice strips 1 ft. 3 in. x 8 ft.; 33 lin. ft. porch soffit and trim; 48 lin. ft. porch cove; 33 lin. ft. porch base. **Interior Doors:** 1—2 ft. x 6 ft. 8 in.-1⅜, No. 1102; 2—2 ft. 6 in. x 7 ft.-1⅜, No. 1102; 1—2 ft. x 7 ft.-1⅜, No. 1102; 2—2 ft. 6 in. x 6 ft. 8 in.-1⅜, No. 1102; 5—2 ft. 4 in. x 6 ft. 8 in.-1⅜, No. 1102; 1—2 ft. 6 in. x 6 ft. 8 in.-1⅜, No. 5XP, No. 720. **Jambs:** 1—2 ft. x 6 ft. 8 in.; 2—2 ft. 6 in. x 7 ft.; 1—2 ft. x 7 ft.; 2—2 ft. 6 in. x 6 ft. 8 in.; 5—2 ft. 4 in. x 6 ft. 8 in.; 1—2 ft. 6 in. x 6 ft. 8 in.; 2—3 ft. 6 in. x 7 ft. **Interior Trim:** 3 sides trim 8 x 10-3L; 1 sides trim mul. 8 x 10-3L; 3 sides trim 10x14-16L; 8 sides trim 9 x 12-12L; 1 sides trim 10 x 16-6L; 1 sides trim 10x14-12L; 1 side double casement trim 10x16-6L; 1 side trim 3 ft. 6 in. x 7 ft.; 1 side trim 2 ft. 8 in. x 7 ft.; 2 side trim 3 ft. x 7 ft.; 2 side trim 2 ft. x 6 ft. 8 in.; 4 side trim 2 ft. 6 in. x 7 ft.; 2 side trim 2 ft. x 7 ft.; 4 side trim 2 ft. 6 in. x 6 ft. 8 in.; 10 side trim 2 ft. 4 in. x 6 ft. 8 in.; 2 side trim 2 ft. 6 in. x 6 ft. 8 in.; 4 side trim 3 ft. 6 in. x 7 ft.; 1 flight basem't stairs with rail; 1 flight main stairs with rail; 1 ladder to attic; 1 towel cabinet; 1 med. cabinet No. 2835; 1 scuttle door jamb and trim; 1 utility door jamb and trim; 1 mantel shelf; 1—3 ft. 6 in. kitchen cupboard; 1—3 ft. kitchen table; 1—3 ft. 9 in. kitchen cupboard; 1 drain board; 1—1 ft. 9 in. table; 1 meter cabinet; 10 lin. ft. closet shelving; 10 lin. ft. closet hook strip; 10 lin. ft. rod; 450 lin. ft. base; 450 lin. ft. base shoe; 450 lin. ft. base moulding; 214 lin. ft. picture moulding; 106 lin. ft. ceiling cove; 12 lin. ft. threshold; 28 lin. ft. chair rail.

HARDWARE—5 cellar sash sets; 13 sash locks; 13 sash lifts; 2 sets casement hardware; 20 storm sash and screen sets; 12 pr. shutter hardware sets; 2 single shutter hardware sets; 1 front door set with butts; 1 rear door set with butts; 2 outside porch door sets with butts; 4 storm door sets; 4 screen door sets; 1 floor hinge; 2 push plates; 11 inside door sets with butts; 16 door bumpers; 4 doz. clothes hooks; 4 stair rail brackets; 2—8 x 8 screen vents; 1 coal chute; 1200 lb. assorted nails; 330 lb. sash weights; 3 hanks sash cord; (towel cabinet: 1 pr. ornamental butts, 1 cupboard turn); (medicine cabinet: 1 pr. ornamental butts, 1 cupboard turn); 4 friction stays utility door; 1 pr. hinges—scuttle door; 1 drawer pull—drain board; (kitchen cabinet: 4 drawer pulls, 1 set casters, 1 bin pull, 4 pr. ornamental butts, 2 cupboard turns, 2 blind catches); (kitchen cabinet: 6 pr. ornamental butts, 3 cupboard turns, 3 blind catches); (meter cabinet: 1 pr. ornamental butts, 1 cupboard turn); 1 set drop-leaf table hinges.

TINWORK—1 flower box lining; 16 sq. ft. tin deck; 42 lin. ft. flashing; 4 sheets sheet tin; 300 tin shingles; 32 lin. ft. ridge roll; 2 finials; 1 bin lining; 80 lin. ft. gutter; 6 gutter ends; 30 gutter hangers; 4 nipples; 4 elbows; 4 offsets; 4 shutoffs; 4 strainers; 76 lin. ft. conductor; 20 conductor straps.

EXTERIOR PAINTING—42 gal. shingle stain for walls; 6 gal. trim paint; 1 gal. boiled oil; 27 gal. shingle stain roof; 1 gal. porch floor; ½ gal. porch ceiling; ¼ gal. shutter paint; ½ gal. sash color; ½ gal. screen color; 1 gal. japan; ½ gal. shellac; 15 lb. putty.

INTERIOR PAINTING—13 gal. white paint; 9 gal. enamel; 6 gal. filler stain; 3 gal. shellac; 12 gal. interior varnish; 4 gal. shellac for floors; 7 gal. floor varnish; 2 gal. oil; 1 gal. japan; 2 gal. turpentine; 1 gal. alcohol; 4 doz. sheets sandpaper; 2 lb. steel wool.

WEATHER STRIPPING—4 door openings; 5 sash openings; 13 window openings; 2 casement openings.

CAULKING—5 cellar sash frames; 13 window frames; 2 casement frames; 1 door frame; 1 coal chute.

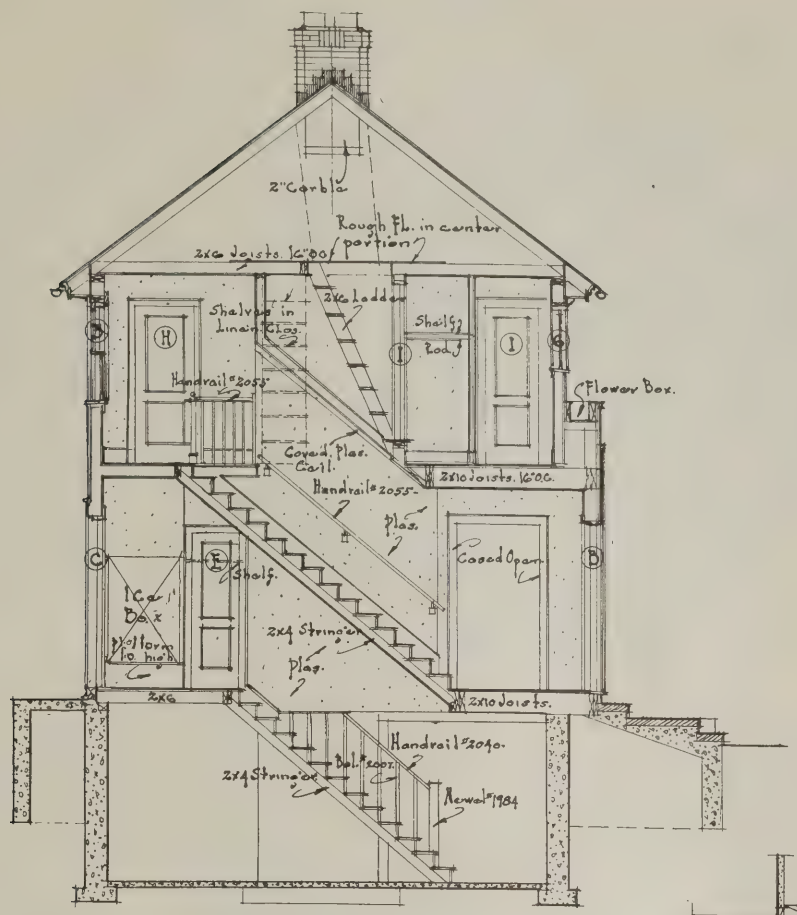
INSULATION—570 ft. ½ in. flaxlinum (or equal) for second floor ceiling; 1700 ft. ½ in. flaxlinum (or equal) for walls; 3 rolls paper for floors; 4 rolls paper for walls; 3 rolls paper for roof.

PLUMBING—1 sewer and water connection; complete roughing in and venting materials; 1 floor drain; 1 ice box drain; 1—2 part laundry tub; 1 hot water tank with furnace coil; 1 kitchen sink; 2 sill cocks; 1 lavatory; 1 toilet; 1 bath tub; 1 clean-out pit.

REINFORCING STEEL—12 pcs. ⅜ rods, 8 ft.

FLOORING—If changed in dining room, deduct from survey 174 ft.; if changed in living room and hall, deduct from survey 410 ft.; if changed in kitchen and entry, deduct from survey 226 ft.

INTERIOR TRIM. (Note this is included in Survey)—Hall, Living Room and Dining Room—1 dr. 3 ft. x 7 ft.-1¾; 2 dr. 3 ft. x 7 ft.-1¾, No. 1605; 1—2 ft. 6 in. x 7 ft.-1⅜, No. 1102; 1 dr. 2 ft. x 7 ft.-1⅜, No. 1102; 1 jb. 2 ft. x 7 ft.; 2 jb. 3 ft. 6 in. x 7 ft.; 1 flight main stairs; 1 side door trim 2 ft. 6 in. x 7 ft.; 4 side opening trim 3 ft. 6 in. x 7 ft.; 3 side dr. trim 3 ft. x 7 ft.; 1 side dr. trim 2 ft. 6 in. x 7 ft.; 1 mantel shelf; 3 sides single window trim 10 x 14-16L; 1 side single window trim 10 x 14-12L; 130 lin. ft. base; 130 lin. ft. base shoe; 130 lin. ft. base moulding; 106 lin. ft. ceiling cove; 106 lin. ft. picture moulding.



SECTION
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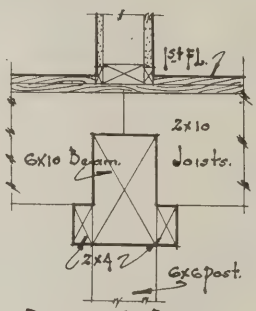
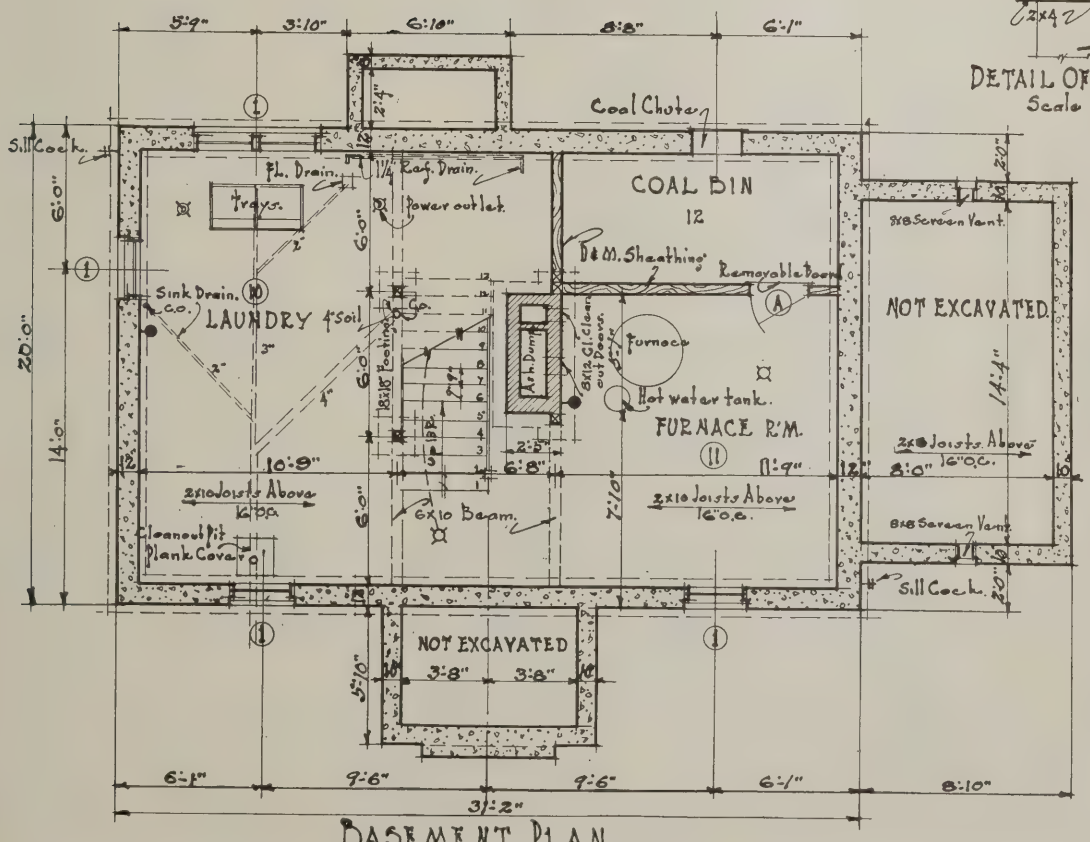
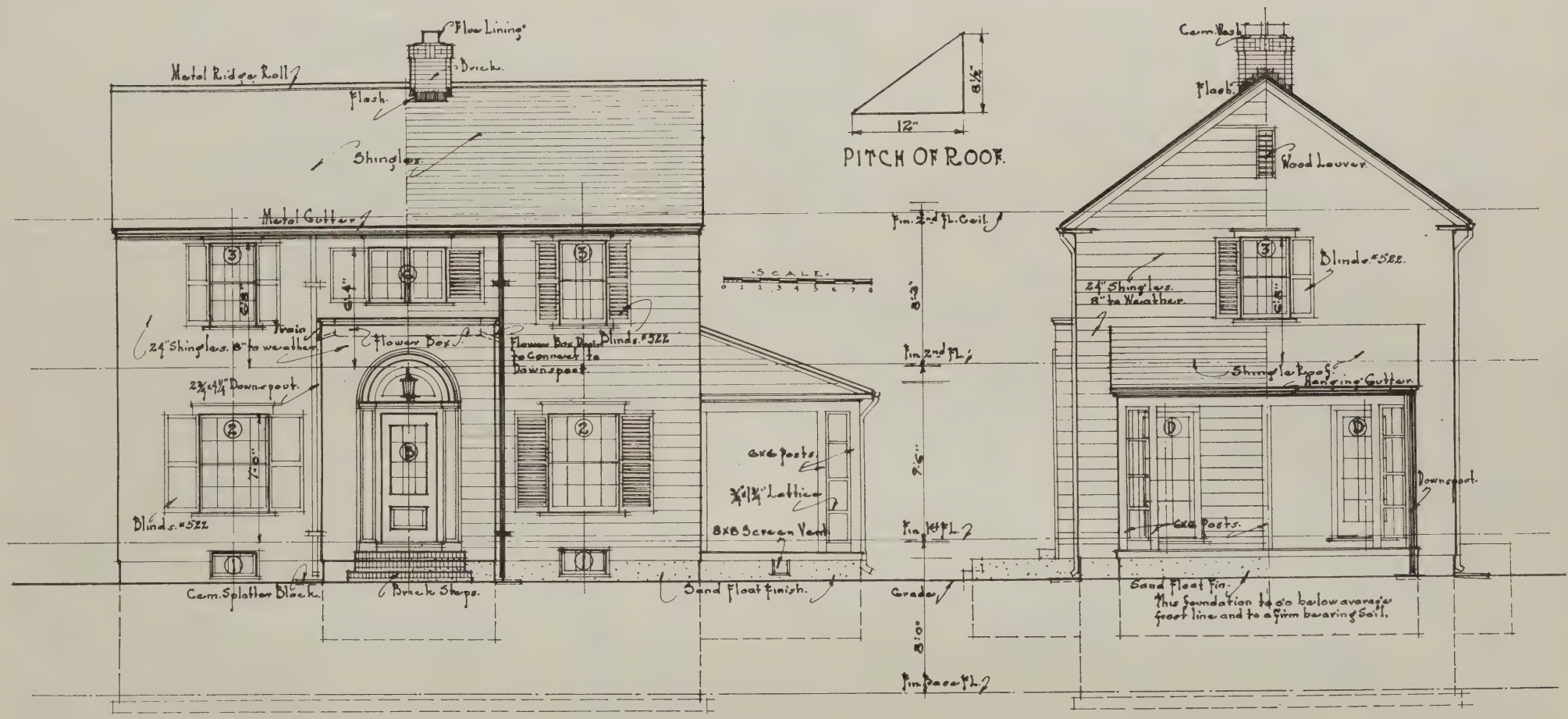


DETAIL OF BEAM
Scale 1½"=1'-0"



BASEMENT PLAN

Details of House No. 5A53. Copyrighted by National Builder and The Architects' Small House Service Bureau



FRONT ELEVATION

SIDE ELEVATION

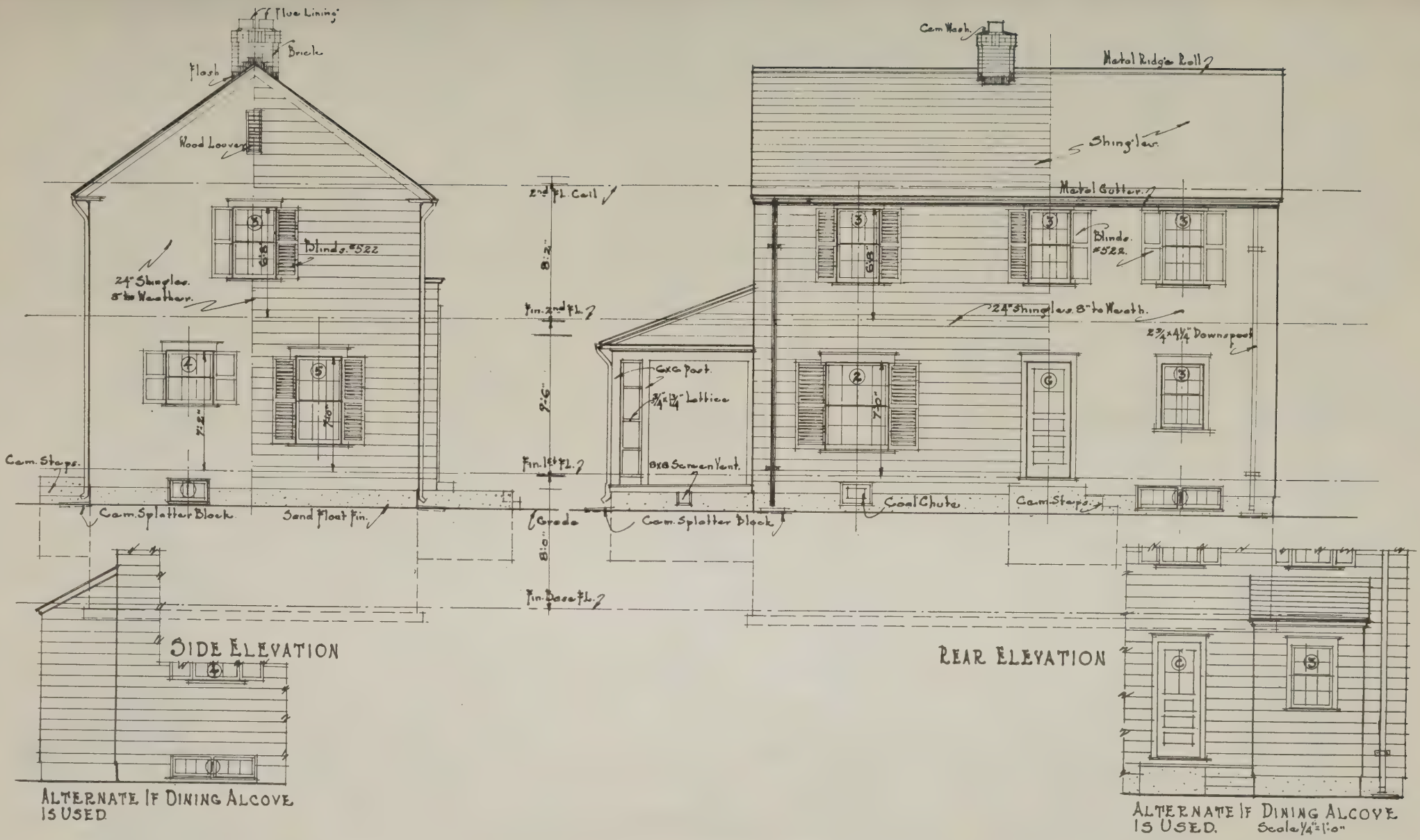
Front and side elevations of House No. 5A53, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc. Copyrighted by National Builder and The Architects' Small House Service Bureau

Dimensions are taken to outside of foundation walls, to outside of studs on exterior walls and center of studs per partitions.

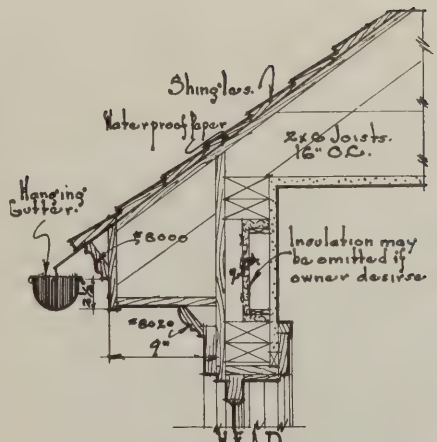
Foundation walls shown concrete may be stone, brick, concrete block or load-bearing hollow tile. Where building ordinances permit, foundation walls may be 9 in. thick (with 20 in. x 9 in. footings.) except in case of stone, which shall be 18 in. thick.

Stock numbers refer to muildings in Universal Millwork Design Book No. 20. In case these mouldings can not he procured, others of similar design and size may be substituted.

Provide 1⅜ in. screen and storm sash for all exterior openings except ice door unless otherwise noted. Bottom rail of storm sash to have vent.



Side and rear elevations of House No. 5A53, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc. Copyrighted by National Builder and The Architects' Small House Service Bureau



DETAIL OF DOUBLE HUNG WIND. AND SECTION THRU WALL
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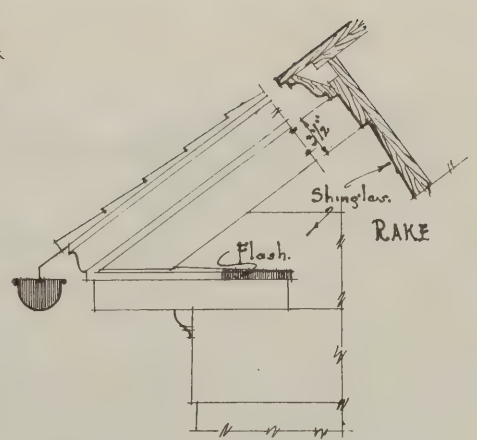

ELEVATION MAIN CORNICE
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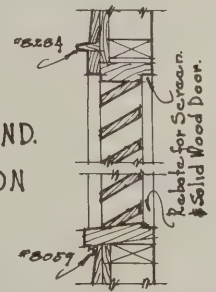
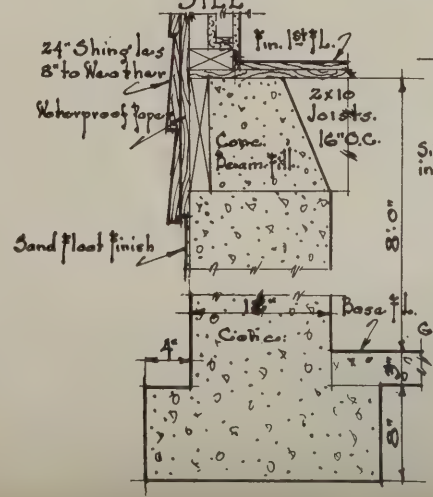
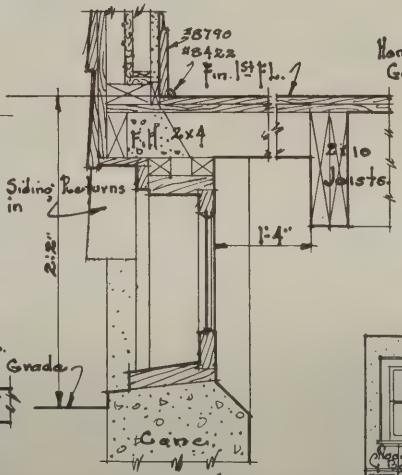
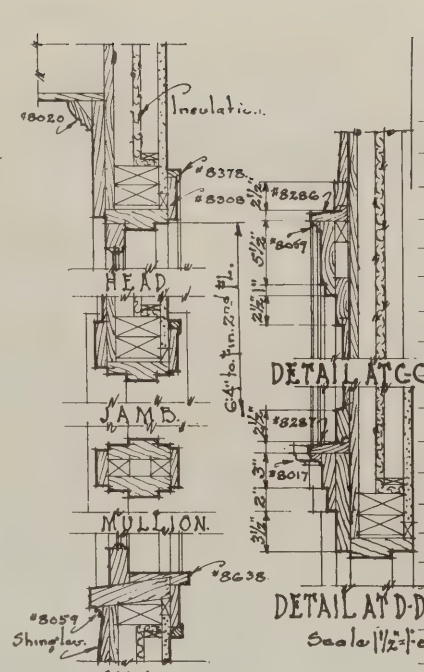


DETAIL OF LOUVER
Scale 1½"=1'-0"

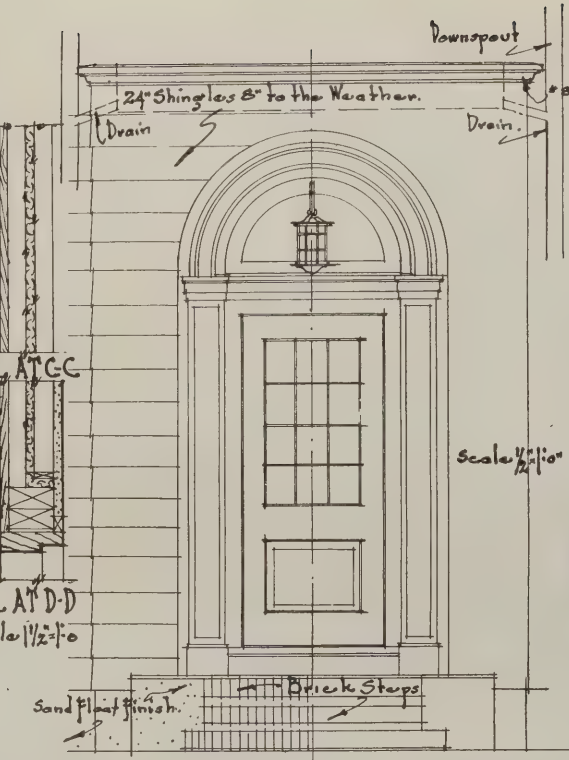




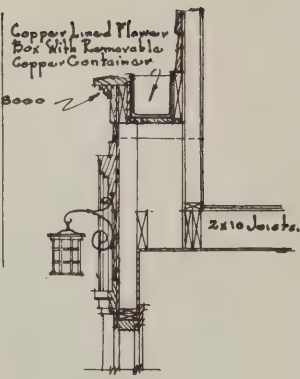
DETAIL OF BASEMENT WINDOWS.



DETAIL OF CASEMENT WIND.
Scale 1½"=1'-0"



ELEVATION & DETAILS OF ENTRANCE



SECTION
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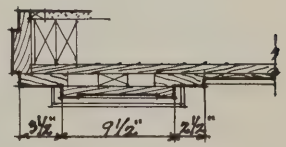
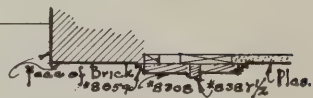


DETAIL AT E-E
Scale 1½"=1'-0"



DETAIL AT B-B.
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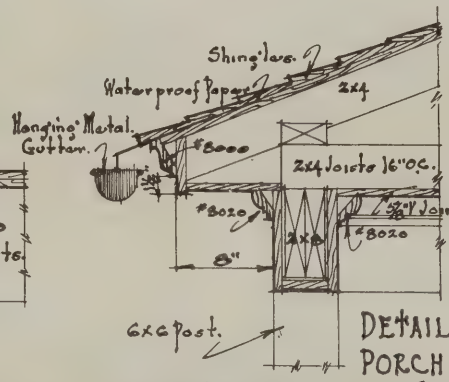

DETAIL OF PORCH CORNICE
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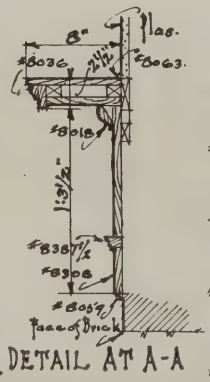
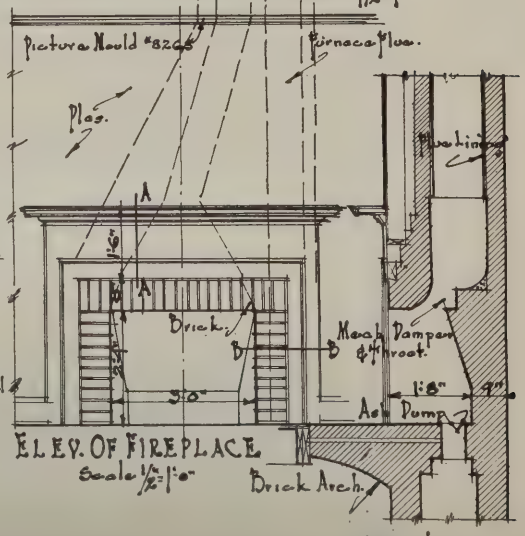


DETAIL AT A-A



ELEV. OF FIREPLACE
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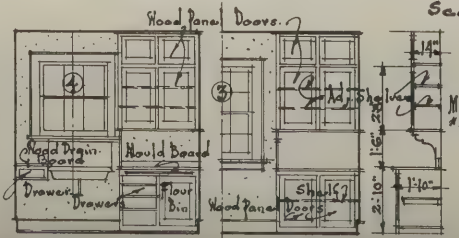
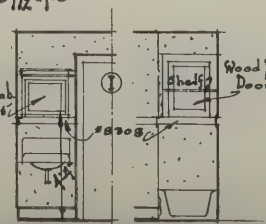
SECTION



KITCHEN TOWARD SINK KITCHEN TOWARD REAR SECTION



BATH ROOM ELEVATIONS.

Good Practice in Plastering*

Desirable Standards Suggested by the Building Code Committee of the United States Department of Commerce

WHEN plaster is to be applied directly to masonry surfaces, these should be rough in texture but not uneven; free from dust, laitance or other loose material which will prevent a good bond between plaster and wall; and particularly from grease, which will cause discolorations. The wall surface should be wet enough so that it does not withdraw water from the plaster, but not so wet as to fill the surface pores and prevent good bond or interfere with hardening. Care in this respect is not so important with lime plasters as with gypsum because lime holds water against suction better than gypsum and because water is not required for hardening lime while it is for gypsum.

Masonry walls may be furred either with clay or gypsum furring tile, which furnishes a plastering surface, or by attaching wood or metal lath properly furred to the masonry. Where walls are likely to be damp, hollow tile furring will be more satisfactory than gypsum.

To prevent undue lateral expansion and contraction of wood lath, which shears and loosens the plaster keys, such lath should not be over 1½ by ⅜ in. in section and key spaces should not be less than ⅜ in. for lime plaster or ¼ in. for gypsum plaster. Wood lath should be thoroughly wet when plaster is applied. Lath should be attached to at least three supports, and good practice requires broken joints at least every eight lath.

Expanded metal lath weighing 2.2 lbs. per sq. yd., or No. 20 wire cloth, 2½ meshes to the inch, are sufficiently rigid for plaster supports in small dwellings where timbers are spaced not more than 16 in. for walls and 12 in. for ceilings. Longer spans demand heavier lath or special stiffeners. Ends of sheets should be joined over supports, and horizontal edges lapped and laced securely with wire. Continuous sheets bent around corners tend to prevent corner cracks in the plaster. It is recommended that all metal lath be either galvanized or painted.

Gypsum plaster boards are essentially squares of gypsum plaster, coated on both sides with paper, or instead of paper, wood fiber or other vegetable fiber is mixed with the material of which the boards are made. They are usually about 32x36 in. and supplied in thicknesses from ¼ in. up. For small dwellings, where the distance between supports is as given above, ¼ in. board may be used. For greater spans a thicker board is required for rigidity, but in no case should the board be so thick that its face is not amply covered by the plaster in obtaining the required thickness. Each board should be fastened to at least three supports and all joints perpendicular to supports should be broken. The surface of the board is finished so that plaster adheres readily and should not be wetted when plaster is applied.

While the use of plasterboard is understood at times to result in cracks, the material does not differ greatly in this respect from wood lath and plaster; is much superior to the latter in point of fire resistance; and least equivalent in strength and rigidity.

Plaster Materials

In a few localities, plaster can be obtained mixed ready to spread on the wall. This practice permits more careful selection of the ingredients, better porportioning, and more thorough mixing than where the plaster is prepared on the job. The use of such plasters is therefore recommended wherever they can be obtained of good quality and at reasonable cost.

For preparation of plaster on the job lime and gypsum average about the same in cost, each having the advantage in some markets. Lime will carry about twice as much sand as gypsum, and this is economical. On the other hand, the setting time of gypsum plasters can be regulated at will, which permits planning the work with resultant saving. Gypsum plaster has greater inherent strength and much better fire resistive qualities than lime plaster. Lime plaster can be brought to equal strength by tempering with portland or Keene's cement, and is much more resistant to moisture than gypsum plaster. The latter should not be used in combination with portland cement nor in contact with portland cement concrete. Selection of plasters should be made with reference to local practice, better work usually resulting with familiar materials.

A type of gypsum, manufactured by a new process, has the same plasticity and sand carrying capacity as lime, while it retails the quick set and strength of gypsum.

Gypsum wallboard represents the nearest present approach to manufacture of completed plaster at the factory, ready to be erected in place. It is supplied in sheets 4 ft. wide; in lengths to fit the height of a room; usually ⅜ in. thick; and coated on both sides with paper. It should be erected with no side joints between boards and the end joints always over support. If desired it may be painted or otherwise decorated after erection. The joints between boards are usually covered with wood or paper strips. Wallboard in place is cheaper than plaster; also inferior as a heat or sound insulator and in fire resistive qualities. Wallboard possesses the essential characteristics of rigidity, strength and finished surface common to plaster, and in addition avoids some of the dangers, such as poor sand, and unskilled mixing and application, which endanger the durability of plaster prepared from materials on the job.

Mixing and Application of Plaster

Proportions of sand and lime or gypsum should be such as to use as much sand as possible without reducing strength below a necessary minimum. The best proportions will vary with each grade or make of materials. Common practice requires the scratch coat to be 1 part by weight of hydrate lime to 3½ parts of sand, or 1 part of gypsum to 2 parts sand. Corresponding figures for the brown coat are 1 to 4 for lime and 1 to 3 for gypsum. For best results these proportions must often be varied but the old custom of adding sand by guess until it "feels right to the plasterer" cannot be too strongly condemned.

The finish coat requires a very plastic lime prepared as putty and aged for about two weeks, after which it is mixed with about half its volume of gypsum, applied to the wall and troweled to a smooth, hard finish. Much skill and care is needed for success, though the new plastic gypsum, noted above, can be used without addition of lime, thereby facilitating the work.

Number and Thickness of Plaster Coats Necessary

It is entirely possible to produce a pleasing surface on the brown coat, so that no finish coat is required. The exposed aggregate method of making colored concrete is equally applicable to plaster, and requires merely a little care in the selection of the sand. If the brown coat is made of gypsum wood-fibred plaster, the wood fibres may be dyed, and exposed by washing the plaster after it has set, to give pleasing effects as to both color and texture. The ordinary brown coat may be rubbed down to a sand float finish, which is satisfactory for some purposes, and may be improved by painting.

*From the Preliminary Report of the Building Code Committee of the United States Department of Commerce.

If the finish coat is omitted and a strong (rich) gypsum plaster used the customary 7/8-in. thickness for plaster can safely be reduced to 5/8-in. or even less. This would mean considerable economy with slight sacrifice of desirable qualities. Where rigidity is not important two coats are sufficient whether scratch and brown or scratch and finish. Masonry walls and ceilings are plastered almost entirely for decorative reasons and one coat, properly selected, is entirely sufficient if the surface is not too uneven. Under most unfavorable conditions two coats, totaling 5/8 in. thickness are all that should be required.

Furring

In regions subject to low temperature, high winds heavy rains or extreme humidity of considerable duration, furring of solid masonry walls is practically a necessity to avoid unwholesome living conditions caused by damp walls, also the danger of ruining wall decorations.

In arid localities where low temperatures are infrequent, furring may be omitted without serious results, but should be used wherever economy in construction cost is a secondary consideration.

Waterproofing paints or compounds applied to the interior of solid masonry walls help considerably to prevent moisture penetration but have little effect in preventing condensation and make it difficult to bond plaster directly to such treated walls.

Furring is somewhat less necessary on masonry walls of hollow units, since the enclosed air cells help to check transmission of heat and moisture. However, mortar joints running through the wall are found to conduct moisture readily when poorly or incompletely made, and walls having such continuous joints require furring.

Furring a masonry wall lessens its heat conductivity from 15 to 20 percent thus saving considerable fuel, which saving, of course, continues throughout the life of the structure and may repay many times over the increased cost of furring.

Since hollow walls are good heat insulators, it has been found in many places that furring may be omitted and plaster applied directly to the interiors of walls which are built with a continuous hollow space or in which the mortar joints extend but part way through the wall.

In concrete house construction provision for insulation of exterior walls is recommended. A dead air space within the wall proper or formed by furring and plastering has been found effective and this requirement seems to be favored by those recommending the use of concrete external walls.

In applying plaster to furring lath, it is important that the keys shall not project through so as to touch the wall, nor be allowed to drop off and form a solid mass between plaster and wall. In either case moisture from the wall is liable to be transmitted through the plaster producing troublesome results such as staining the wall, and ruining the lath—wood lath by dry rot and metal lath by corrosion. It is claimed that excellent results in furring 8 in. brick walls are obtained by attaching a layer of tarred paper to the back of the furring strips, or by using lath in which such paper forms an integral part.

Incombustible furring is excellent since it entirely prevents a fire creeping along a wall from one story to another behind the plaster. Hollow tile or gypsum furring blocks are much used and are quite satisfactory. They have grooves in the back face which furnish air spaces between the wall and the plaster. There are also several forms of metal furring to which metal lath is attached and which serve the same purpose. Where walls are likely to be damp, hollow tile furring will be more satisfactory than gypsum.

Why Contractors Encroach on the Architect's Field

Abstract of an Address by J. C. Edwards, President of the Southern California Chapter, A. G. C., Los Angeles, Calif.

I INTEND to be very frank and name a few of the real reasons why contractors, who feel themselves capable, encroach on the architect's field. . . .

There has been a decided change in the personnel of the general contractors in the building industry during the past 20 years or even during the past 10 years. Improved methods are definitely eliminating the rule-of-thumb contractor, and the contractor of today feels that he is entitled to and should receive the same recognition as the architect or engineer.

Your profession has permitted commercialism to gain such a foothold that, in many cases, completeness of plans and specifications is sacrificed in order that more of the fee may be retained as a net profit. Where this is done controversies arise, extras are claimed, and both owner and contractor are dissatisfied.

Government Red Tape Offset

The thing that makes government red tape on construction work bearable is the wonderful completeness of the plans and specifications and the exactitude with which one can determine the volume and kind of work to be done.

The custom of calling for such a multitude of alternate bids is not looked on with favor by the contractor. He feels that it is part of your service to the owner to predetermine the volume of work to be done and the kind of materials to be used.

Contractors feel that in many cases bids are requested and their time consumed in preparing estimates on work, when the architect knows there is not even a remote possibility of the work going ahead; and it is a very common occurrence for a contractor to submit a proposal to an architect and for that proposal to be held for a month or more without being accepted or rejected, the contractor being unable to obtain any information regarding same. This is obviously unjust and should not be continued if it is your intention to recognize the service rendered to the industry by the contractor.

Draw your contracts so as to show fairness to both parties concerned, the owner and the contractor. Insert an arbitration clause in them so that honest differences may be settled out of court. This may be working a hardship on our friends, the attorneys, but nevertheless it is a most satisfactory way of adjusting disputes.

In your contracts and specifications avoid the shifting of responsibility. I have seen contracts based on specifications which provided that the contractor was to assume all responsibility for plans and specifications complying with city ordinances.

Tit for Tat

Conditions such as I have mentioned have a tendency to create a desire in the contractor to undertake himself the architectural service necessary to a construction project, and it is with increasing frequency that you hear of it from the larger contracting firms.

Please do not think for one moment that I fail to appreciate the fact that in many instances contractors have, by their unsatisfactory methods, driven the architects to seek a method whereby they might be eliminated.

It is necessary, however, that we tell you our troubles and you tell us yours if anything is to be done to check this tendency to encroach on one another's field.

There never was a truer saying than this: "A man who is his own attorney has a fool for a client." The principle is applicable to construction. We each have a distinctive service to perform and I doubt very much the ability of either of us to successfully assume the other's position.

Our association will heartily endorse any effort on your part to eliminate the undesirable man in the business, because by so doing we both will be rendering a really honest service to the public. Unless such a service is rendered there is no justification for the existence of yours, ours, or any similar organization.

National Builder Style Sheet

One of the houses (House A—Floor plan on page 43) of Urwin J. Magill at Rye, N. Y., described elsewhere in this issue

Another of Urwin J. Magill's houses (House B—Floor plan on page 43). Note roof effect

An old-world atmosphere in a suburban house (House D—Floor plan on page 43)

House G—Plan on page 44; another of Urwin J. Magill's houses

Vari-colored composition shingles add to effectiveness of House H—plan on page 44

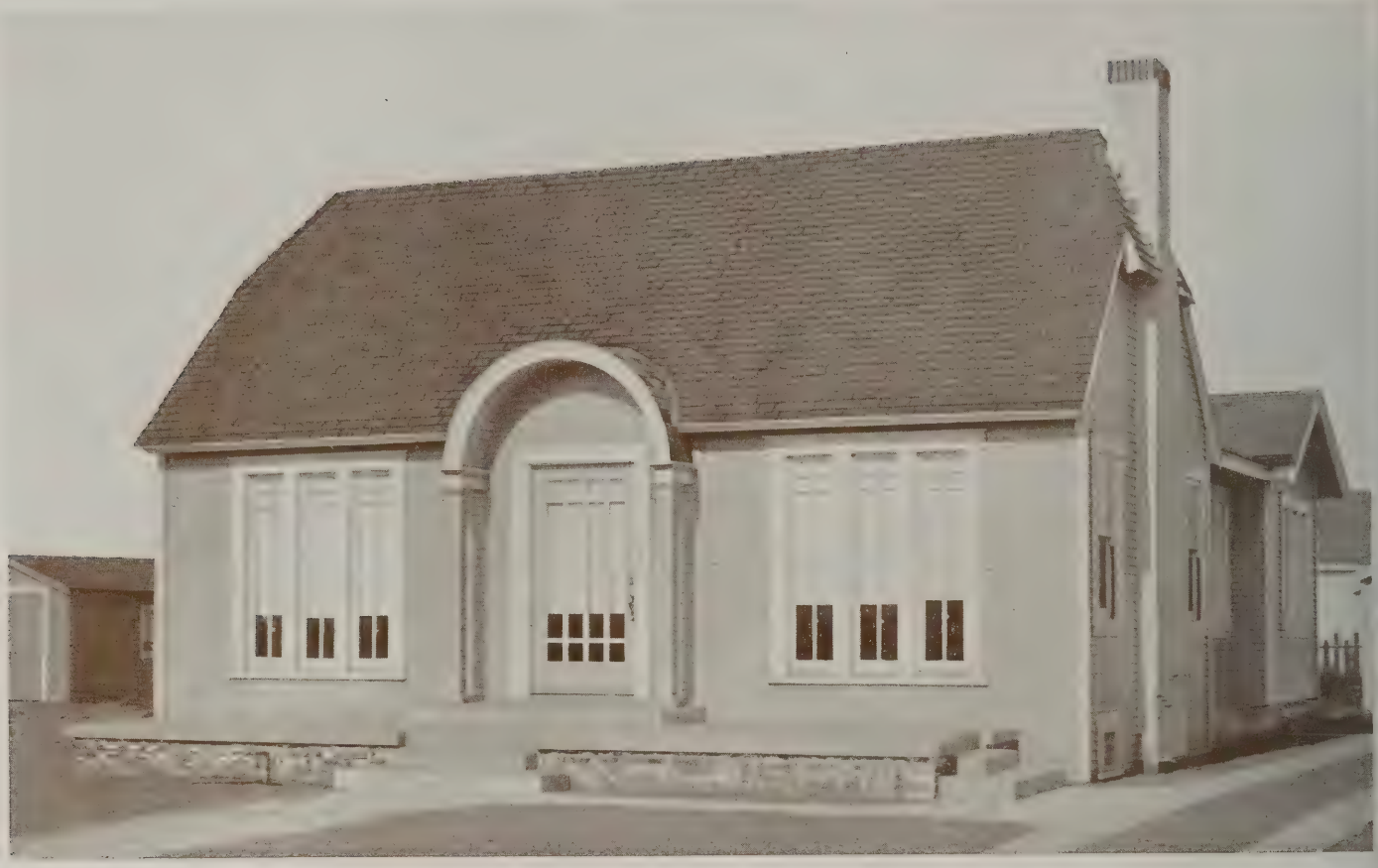
Effective use of stucco and composition shingles (House I—plan on page 44)

Not all of the Magill houses are old-world types. Here is House L—plan on page 44

An effective chimney of native stone (House M—plan on page 44)

House N—plan on page 45—by Urwin J. Magill at Rye, N. Y.

A Winnetka, Ill., suburban house designed by Charles E. White and Jim T. Pomeroy, architects, Chicago, and built by Frederick A. Cooper & Co., Winnetka



Another California bungalow with a dominant doorway

Southern California bungalow of individuality using stucco

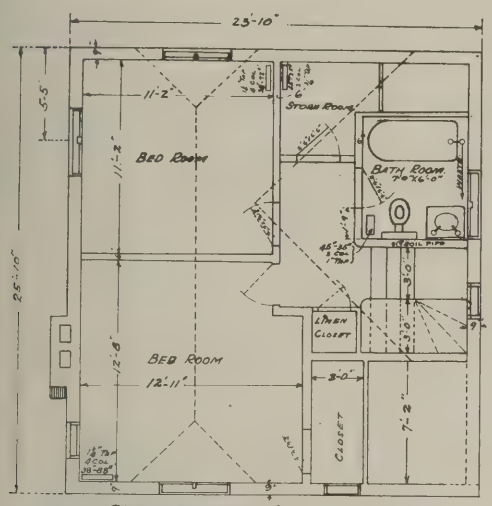
Rather plain but unusual looking frame bungalow from Southern California

Attractive entrance of California bungalow gives distinction to this design

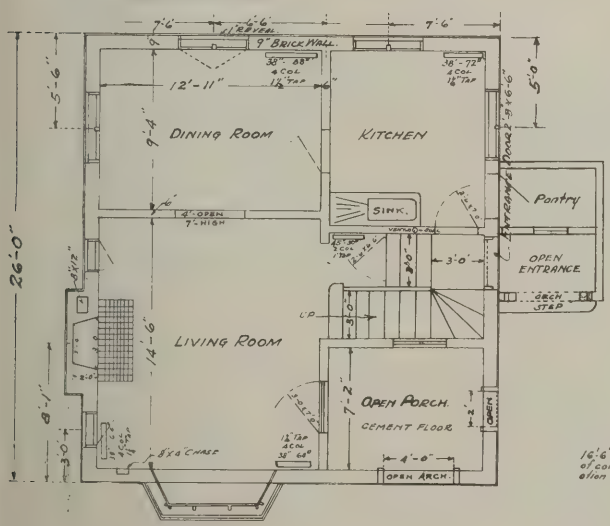
House at Glencoe, Ill., designed and built by James Pole, a civil engineer (plans on opposite page). The wall is constructed of second-hand brick, with ordinary common brick on the outside and 4-in. hollow brick on the inside. The outside finish was obtained by coating the wall surface with an asphaltum compound and oil-painting the brick a cream color

A California bungalow of recent origin—effective use of brick and stucco

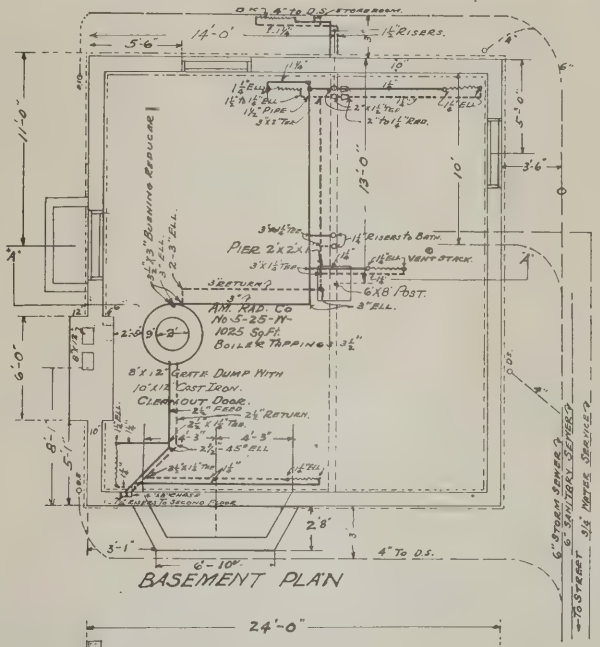
Two brick houses at Glencoe, Ill., designed and built by James S. Pole, C. E., Chicago & Northwestern railway, Chicago



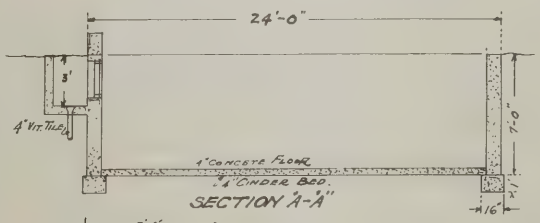
SECOND FLOOR PLAN



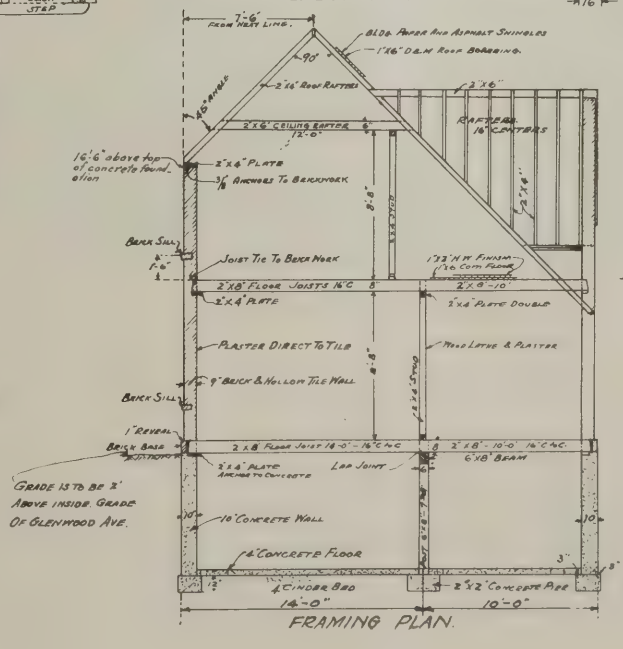
FIRST FLOOR PLAN.



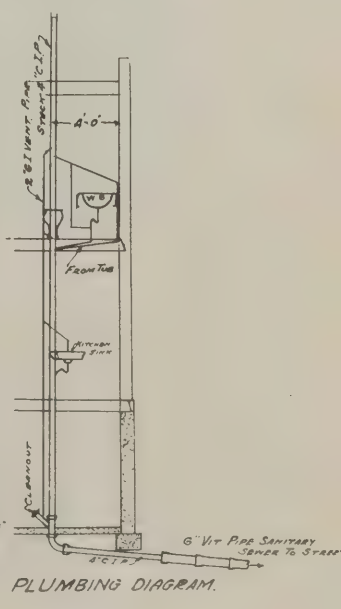
BASEMENT PLAN



SECTION "A-A"



FRAMING PLAN.



PLUMBING DIAGRAM.

Five-Room House at Glencoe, Ill.

THIS is one of two houses built by James S. Pole, head of the track elevation department of the C. and N. W. Ry.

Pressed brick, as a soldier course at the base and as trim around window and door openings, greatly enhances the beauty of the elevation. An interesting fact is the statement by Mr. Pole that the original cost of the buildings about two years ago was in the neighborhood of $6000 each and that their present market value is approximately double that amount.

Houses Designed by Groups for Colony of Renters

Urwin J. Magill, Rye, N. Y., Rivals His Brother's Operations as a Designer, Builder and Developer

THE February issue of NATIONAL BUILDER described the scheme of a young man in Rye, N. Y.—H. Leland Magill—who builds pretty houses to lease but not to sell. Mention was made of the similar operations of his brother. That brother is Urwin J. Magill, whose work is illustrated herewith.

The houses shown in the illustration below adjoin those of H. Leland Magill, which were described in the February issue. Altogether they comprise a remarkably pretty and striking suburban development.

Rye, N. Y., the suburb in which the two Magill brothers operate, is about an hour's ride on the New York, New Haven & Hartford railroad from the Grand Central Terminal in New York City. A part of the city borders on Long Island Sound, and Rye Beach is a famous summer resort. The country back from the beaches—a mile or so, perhaps, where these houses are located—is rugged and rocky and presents ample background for an artistic development of this character.

There is nothing common or ordinary in any feature of these developments. Even the street layout and yard treatment suggest care and forethought, as the view below makes clear. In this respect Urwin J. Magill has the reputation of being less conservative and more daring than his brother.

Urwin J. Magill operates on a scheme in all respects like that of his brother. He is a designer, builder and operator. He also has a large clientele for whom he designs and builds houses as a builder. The houses shown in the accompanying views are his own. Like those described in the February issue, their cost runs from $10,000 to $20,000 each and they are leased for two-year periods at rentals averaging around $2000 per year.

One of the most interesting features of these developments is the landscaping of whole blocks of houses at one time, and the making of full use of this opportunity to design individual houses in harmony with their neighbors and with the landscape as a whole. This idea is carried out to perfection in the houses illustrated herewith. Each has remarkable individuality, yet each is manifestly a part of a whole scheme.

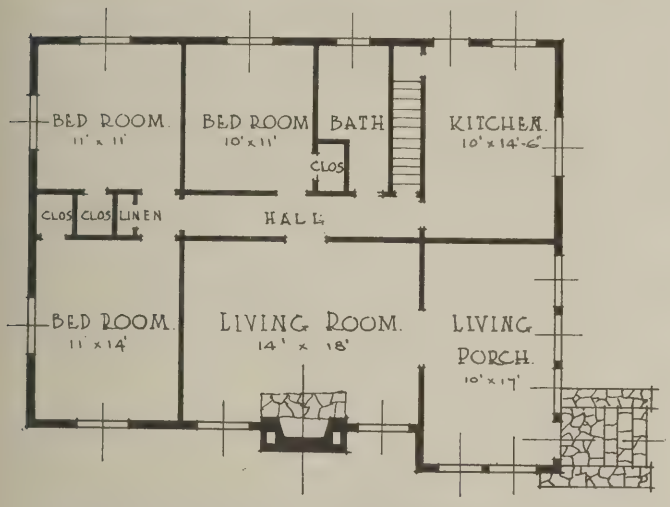
This individual treatment is carried out in many ways, such as keeping the houses at different distances from the building line instead of lining them up with mathematical accuracy, as is so often done on suburban streets. The verandas, trellises, awnings, shrubbery and coloring are all distinctive, yet all harmonious.

Street scene in the Magill development at Rye, N. Y. Note how the lawns are given individual treatment, the homes set back at different distances, etc.

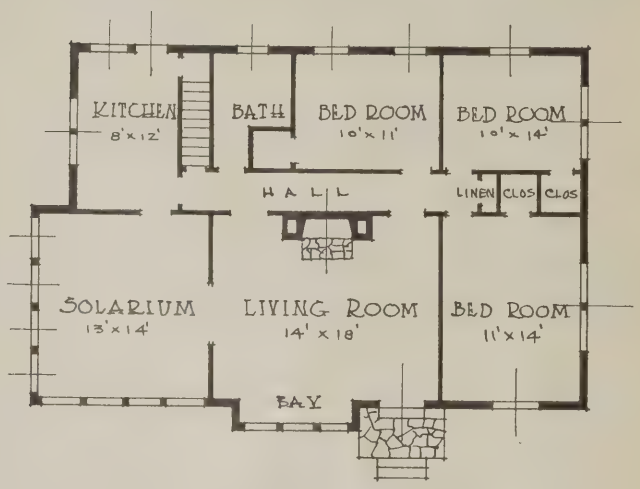
As explained in the previous article (February issue) these houses are built and financed by the owner as a builder and operator. He purchases practically all the materials and equipment, but sublets the labor to various contractors. Land is bought in large blocks and developed as a unit. Most of the houses have been built within the last three or four years, and

Rear of row of Magill houses

Street of Magill houses



House A, 28x40 ft. See Style Sheet for elevation



House B, 28x40 ft. See Style Sheet for elevation

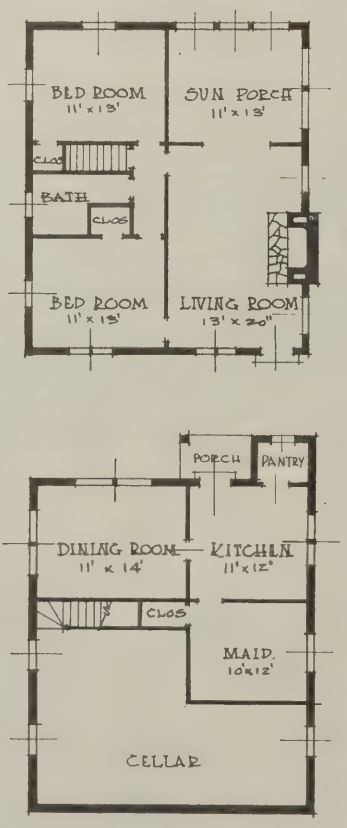
House E (Houses C, D and E have same plan). Elevations of other houses of this plan are shown in the Style Sheet

the development is growing with great rapidity.

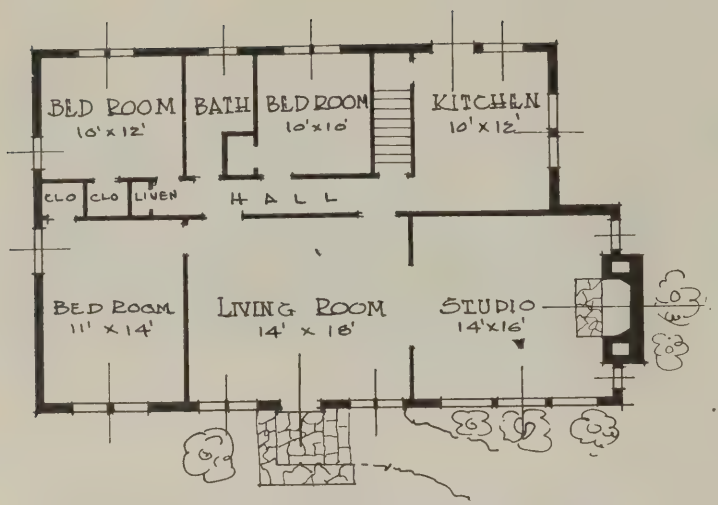
Local stone is much used for basement walls; and the natural landscape is as little altered as possible. This, of course, is practicable in a development of this kind, where the lots are really cut to fit the houses, rather than attempting to fit a house to restricted lot.

Many of these houses have interiors as unique and striking as the exteriors. Many have no ceilings—the rafters are finished off and the room heights go clear to the roof. The fireplaces and mantels are all of special design.

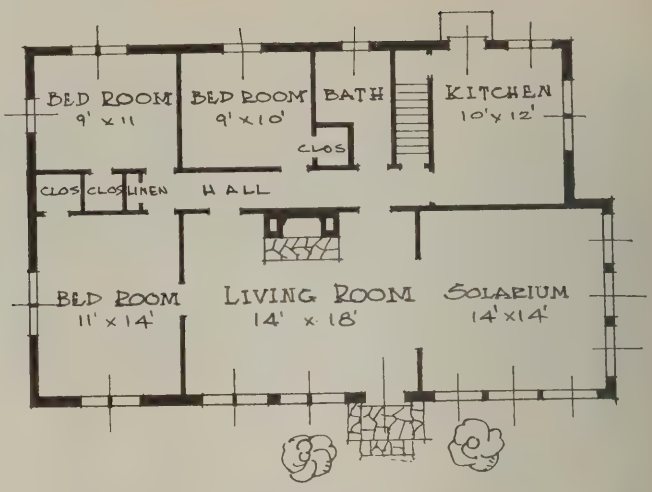
Elevations of many of the houses, the floor plans of which are shown on these pages, will be found in the Style Sheet sec-



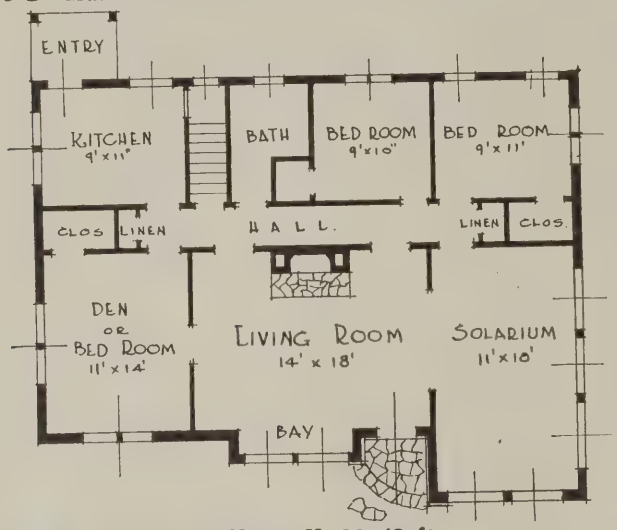
Plans of House D in Style Sheet; also E on this page



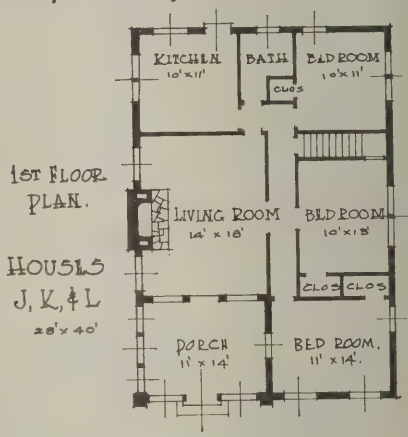
House G—Maid's room on second floor not shown

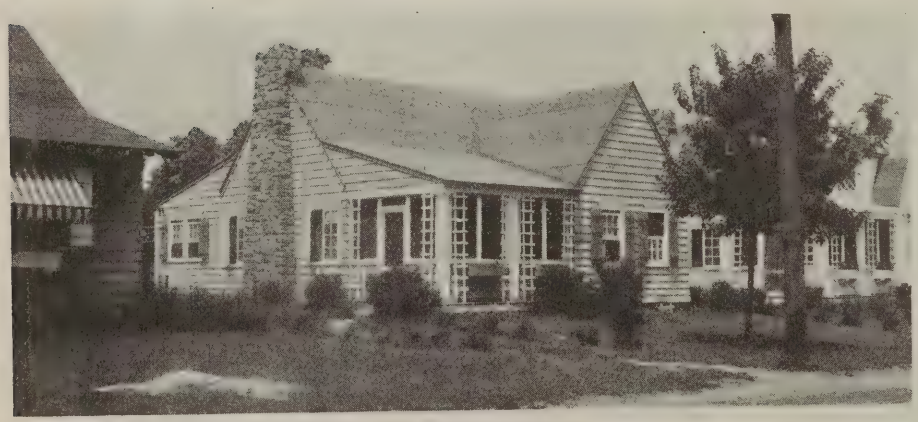


House I—See photo in Style Sheet

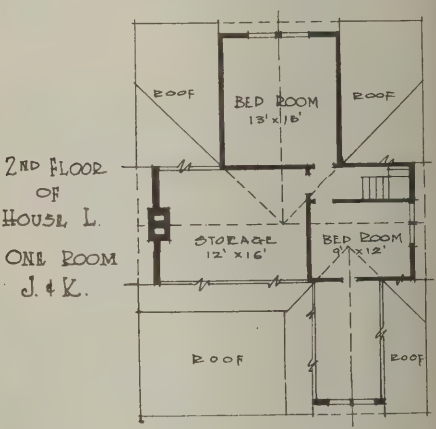


House H, 28x42 ft.





House J—Houses J. K and L all have same floor plan

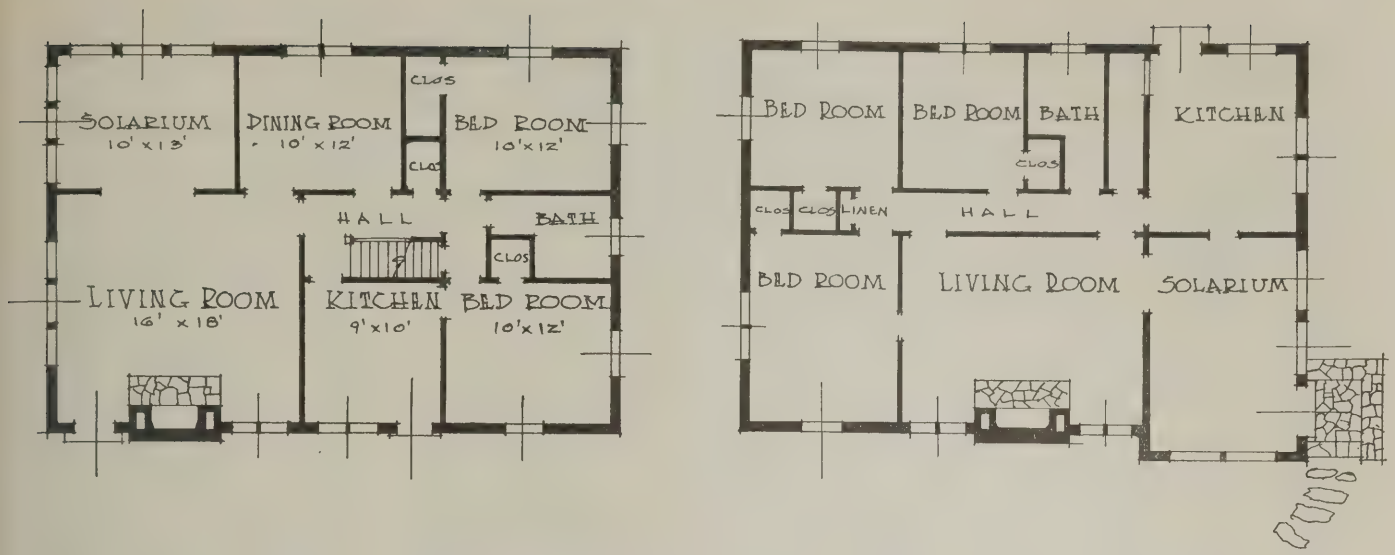


Floor plans of Houses J, K and L. House L is shown in the Style Sheet

House K—Compare with Houses J and L, which have same floor plan

tion of this issue. Particular attention is called to the roof treatment in a number of these houses. The same method of roofing was also shown in some of the houses of H. Leland Magill in the February issue. The method of laying these roofs is explained in the Kinks and Discussion department of this issue.

The possibilities opened to wide-awake builders and operators by the enterprise of the Magill brothers are truly remarkable; for every big city presents a problem to the home-loving family, which for one good reason or another is not in a position to buy real estate. To such—and they are many well-salaried men in every big city—the leasing of an ideal little suburban home is a very real and a much-needed service.



Floor plans of M and N. See Style Sheet for elevations. Part of the Rye, N. Y., development of Urwin J. Magill, designer, builder and operator of suburban homes

House Insulation and Fuel Economy

By H. J. Burt, Structural Engineer, Holabird & Roche, Architects, Chicago

THIS is not wholly an emergency year. Many of the elements that enter into the high cost of fuel are here to stay. Therefore, any method of saving fuel demands thoughtful consideration.

The problem of fuel extravagance is based primarily on poor building construction. The solution of the problem is building insulation. By this is meant application of some material, non-conductive of heat or cold, to the walls and roof of a building.

For each pound of fuel consumed in heating a house there is produced a definite number of heat units. These ultimately escape to the outer air. The longer these heat units can be retained within the building the smaller the amount of fuel that will be required to make up their continual loss.

Heat is lost up the chimney and around the doors and windows. These escapements give a natural ventilation, but the loss of heat by transmission through the walls and roof is wasteful and should be corrected by the application of an effective insulating lumber.

Heat finds its way through the walls whenever there is a difference in the temperature of the inside and the outside air. The loss of heat is directly proportional to this temperature difference. The rate of loss depends on the wall construction.

Prevention of Heat Loss by Insulation

For example, an eight-room house may have approximately 3000 sq. ft. of wall surface. The average difference in temperature in the northern half of the United States is approximately 40 deg. during the winter period. The amount of coal required to supply the heat loss for the above case is 11 tons. By moderate insulation of these walls, one-fourth of this loss can be prevented and by thorough insulation the saving increases to one-third or one-half.

Roofs are even more extravagant than walls in the loss of heat. The ordinary shingle roof will transmit 50 per cent more heat than the ordinary side wall. The insulation of roofs proves proportionately more effective.

In old houses the insulation can be applied directly to the under side of the roof framing. Incidentally, in doing this, useable third-floor space is developed.

It must not be assumed that insulation necessarily adds to the cost of the house. If the design of the heating and ventilating system of the insulated home is in the hands of a competent designer, saving can be effected in both the size of the furnace and the area of radiation because of the smaller amount of heat required.

Besides being a most effective insulation, some materials act as a substitute for lumber in outside sheathing, as a plaster base and as an interior finish for rooms. Taking into account the materials displaced, eliminated and reduced, there are many cases in which the cost of insulation is fully offset and the home with insulation can be built as cheaply as one without it.

An important advantage of insulating houses, not expressed in dollars and cents, is the uniformity of temperature that they maintain.

Uniformity of Temperature

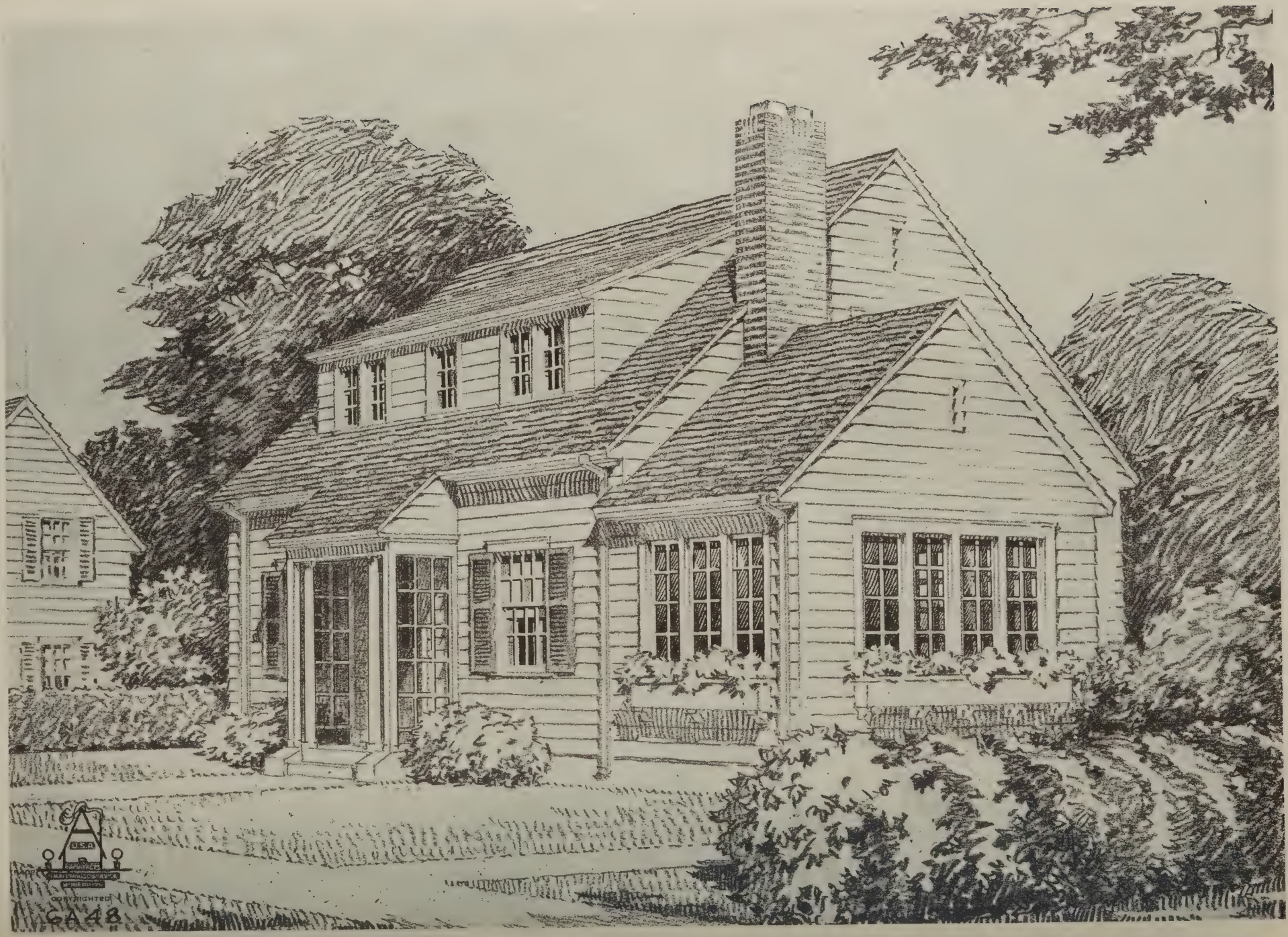
Obviously, if the walls offer effective resistance to the escape of heat, the temperature of the room must remain more neatly constant than when heat is rapidly passing through the walls. Uniform temperature means comfort in every part of the room without the necessity of a constant method of ventilation.

There seems to be no element more vitally concerned for better homes than building insulation. It is justified from every viewpoint. The saving in fuel not only meets any initial expenditure but contributes toward the solution of a very troublesome and important question of our national welfare—the conservation of fuel.

Saves Waste Space

The saving in lumber and laths and the development of waste attic room are concerned with two other national problems; the conservation of wood and housing space. Uniform temperature prevents illness and gives comfort. It is obvious that properly insulated buildings, providing such economies and comforts during the winter months of the year, will prove exceptionally cool in the hot months, as insulation effects a more evenly regulated temperature—keeping the heat out in the summer as it keeps the heat inside in the winter.

Considering all its advantages, failure to insulate a house, built at this time, must be branded as wasteful and inefficient.



House No. 6A48, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.
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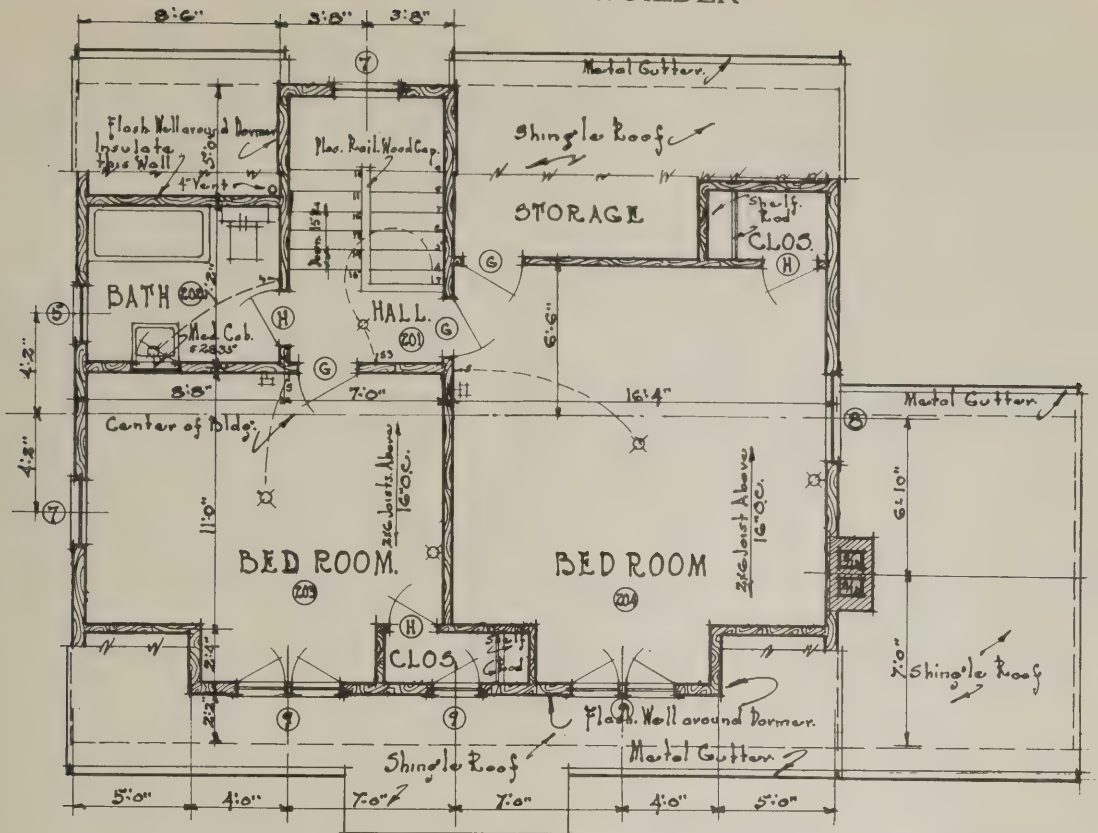
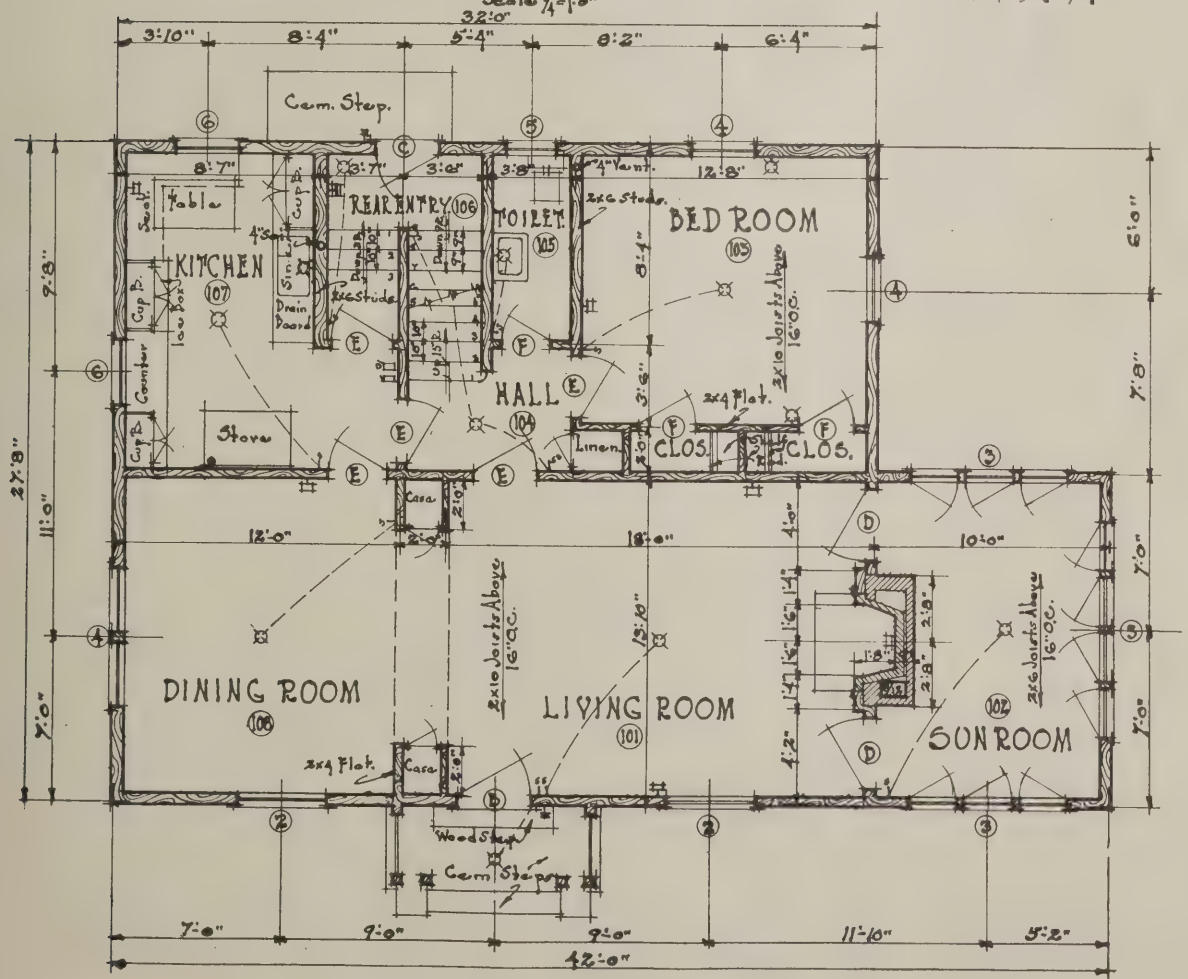


SECOND FLOOR PLAN

Scale ¼"-1'-0"

SCALE



FIRST FLOOR PLAN

Floor plans of House No. 6A48. Copyrighted by National Builder and The Architects' Small House Service Bureau

Colonial Story-and-a-Half House No. 6A48

THERE are some especially fine features about this plan that will be appreciated by experienced builders. The plans call for frame construction with siding on the exterior, sand float base course and shingle roof. A complete basement is provided. It will require a 50-ft. lot if built as shown. Without the porch or sun parlor it can be built on a 40-ft. lot.

Often a first-floor bedroom is a necessity and frequently it is desirable in families where there are very small children, old people, or an invalid. This room is so placed as to be assured of quietness and privacy. The first-floor lavatory is the sort of modern convenience that home owners appreciate. There is also a well-arranged bathroom on the second floor.

The living room and dining rooms are placed on one axis across the front of the house. This is a popular and practical arrangement that makes both rooms appear larger and gives them the advantage of more light and air. They are separated by an archway with closets at either side.

The enclosed porch, on account of its all-the-year usefulness, is growing in popularity every year. Here the drawing provides either for an open porch or the sunroom shown in the illustration.

An unusual amount of closet space is provided. A large linen closet is conveniently placed in the first-floor hallway. The two second-story bedrooms each have a generous clothes closet. The first-floor bedroom has two closets and there is storage space under the roof.

The outside dimension across the front is 42 ft. with the porch and 32 ft. without the porch. The depth is 27 ft. 8 in. It is designed to face west or north. Reversed plans for east or south facing will be furnished without extra charge.

The regular price for this excellent plan is $30 (to NATIONAL BUILDER subscribers, by special agreement the price is $15).

EXCAVATING—215 cu. yd.

BACK FILL—35 cu. yd.

FOUNDATION—If 12-in. concrete, 49 cu. yd. gravel, 198 sax cement; if 9-in. concrete, 40 cu. yd. gravel, 162 sax cement; if 12-in. tile, 23900 CBM tile, 18 cu. yd. mortar; if 9-in. tile, 19000 CBM tile, 15 cu. yd. mortar.

CEMENT FLOOR—5 cu. yd. gravel; 5 cu. yd. sand; 62 sax cement; concrete steps, 2 cu. yd. sand, 12 sax cement; 5 cement spatter blocks.

CHIMNEY—2160 common brick; 600 face brick; 120 fire brick; 28 sq. ft. hearth tile; 200 inside face brick; 56 lin. ft. 8 x 12 flue tile; 24 lb. fire clay; 3 cu. yd mortar; 1 cast-iron ash dump; 1 throat and damper; 1 angle 4 x 3 x 5/16; 2—8 x 12 clean-out doors; 2 adjustable thimbles; 6 sq. yd. metal lath

LATH—11200 lath.

PLASTER—20 sq. yd. sand float on cement; 800 sq. yd. plaster on wood lath; 9 sq. yd. metal lath over boiler; 15 sq. yd. Keene's cement.

TILE FLOORS—52 sq. ft. ceramic tile; 27 lin. ft. cove base.

LUMBER—3—6 x 6-7 posts; 2—6 x 10-16 girders (built up); 4—2 x 4-16 girder ribbon; 63 lin. ft. 2 x 4 basement partition plates; 18—2 x 4-7 basement partition studs; 210 ft. D & M basement partition sheating; 4 ft. 2 in. plank clean out cover; 8—2 x 10-14 first floor joist; 50—2 x 10-14 first floor joist; 4—2 x 10-14 doubles; 3—2 x 10-16 headers; 7—2 x 10-12 box sill; 4—2 x 4-14 stair horses; 300 lin. ft. 1 x 4 bridging; 1140 ft. com. bds. 1st floor sub-floor; 800 ft. 13/16 x 1½ finish floor dining room, living room, sun room; 234 ft. 13/16 x 1½ finish floor bed room and closets; 75 ft. 13/16 x 1½ finish floor toilet and hall; 195 ft. 13/16 x 1½ finish floor kitchen; 414 lin. ft. 2 x 4 first floor partition plates; 121—2 x 4-8 first floor partition studs; 4—2 x 4-16 stair horses; 4—2 x 4-16 headers; 8—2 x 4-14 opening doubles; 7—1 x 4-12 ribbons; 8—2 x 6-14 second floor joists; 50—2 x 10-14 second floor joists; 4—2 x 10-14 doubles; 3—2 x 10-16 headers; 400 ft. com. bds. grounds; 108 lin. ft. 2 x 4 partition plates, second floor; 54—2 x 4-8 partition studs; 5—2 x 6-20 ceiling joists; 11—2 x 6-18 ceiling joists; 10—2 x 6-14 ceiling joists; 10—2 x 6-12 ceiling joists; 4—2 x 6-18 ceiling joists; 4—2 x 6-14 headers and doubles; 860 ft. com. bds. second floor subfloor; 850 ft. 13/16 x 1½ second floor finish floor; 102 lin. ft. 2 x 4 outside wall plates; 34—2 x 4-9 outside wall studs; 354 lin. ft. 2 x 4 outside wall plates; 90—2 x 4-12 outside wall studs; 6—2 x 4-8 gable studs; 22—2 x 4-12 gable studs; 96 lin. ft. 2 x 4 dormer plates; 26—2 x 4-8 dormer studs; 2—2 x 8-24 girders; 44 lin. ft. 1 x 6 ribbon rafter; 18—2 x 4-11 rafters; 7—2 x 4-5 rafters; 18—2 x 4-12 rafter dormers; 6—2 x 4-8 rafter dormers; 18—2 x 4-8 rafters; 6—2 x 4-9 rafters; 31—2 x 4-20 rafters; 2200 ft. shiplap wall sheating; 2000 ft. siding wall sheating; 1760 ft. bds. roof sheating; 13M shingles; 4—2 x 4-16 dormer headers; 25—2 x 4-14 scaffold and extras; 4—2 x 6-16 scaffold and extras; 4—2 x 10-18 scaffold and extras; 3—2 x 8-16 scaffold and extras; 20—2 x 4-12 look outs.

MILLWORK—Frames—3 single frames 8 x 10-3L-1⅜; 1 twin frame 8 x 10-3L-1⅜; 2 single frames 10 x 14-16L-1⅜; 2 triple frames 8 x 14-8L-1¾ casements; 1 quadruple frame 8 x 14-8L-1¾ casements; 1 mul. frame 9 x 14-12L-1⅜; 2 single frames 9 x 14-12L-1⅜; 2 single frames, 12 x 20-4L-1⅜; 2 single frames 9 x 10-12L-1⅜; 2 single frames 9 x 12-12L-1⅜ 1 single frame 8 x 12-16L-1⅜; 2 mul. casements for 8 x 12-6L-1⅜; 1 single casement for 8 x 10-6L-1⅜. **Windows:** 5 cellar sash 8 x 10-3L-1⅜; 2 windows 10 x 14-6L-1⅜; 10 casements 8 x 14-8L-1¾; 4 windows 9 x 14-12L-1⅜; 2—12 x 20-4L-1⅜; 2—9 x 10-12L-1⅜; 2—9 x 12-12L-1⅜; 1—8 x 12-16L-1⅜; 5 casements 8 x 10-6L-1⅜. **Storm Sash** (all vented): 5—8 x 10-3L-1⅜; 2—10 x 14-16L-1⅜; 10—8 x 14-8L-1⅜; 4—9 x 14-12L-1⅜; 2—12 x 20-4L-1⅜; 2—9 x 10-12L-1⅜; 2—9 x 12-12L-1⅜; 1—8 x 12-16L-1⅜; 5—8 x 10-6L-1⅜. **Screens** (all 14-mesh): 5—8 x 10-3L-1⅜; 2—10 x 14-16L-1⅜; 10—8 x 14-8L-1⅜; 4—9 x 14-12L-1⅜; 2—12 x 20-4L-1⅜; 2—9 x 10-12L-1⅜; 2—9 x 12-12L-1⅜; 1—8 x 12-16L-1⅜; 5—8 x 10-6L-1⅜. **Shutters:** 2 pr. for windows 10 x 14-16L-1⅜; 4 pr. for windows 9 x 14-12L-1⅜; 1 pr. for windows 9 x 10-12L-1⅜; 1 pr. for windows 8 x 10-6L-1⅜. **Outside Door Frames:** 1—3 ft. 0 in. x 7 ft. 0 in.-1¾; 1—2 ft. 8 in. x 6 ft. 8 in.-1¾. **Outside Doors:** 1—3 ft. 0 in. x 7 ft. 0 in.-1¾ glazed; 1—2 ft. 8 in. x 6 ft. 8 in.-1¾, No. 753. **Storm Doors:** 1—3 ft. 0 in. x 7 ft. 0 in.-1⅜, glazed; 1—2 ft. 8 in. x 6 ft. 8 in.-1⅜, glazed. **Screen Doors:** 1—3 ft. 0 in. x 7 ft. 0 in.-1⅜, fancy; 1—2 ft. 8 in. x 6 ft. 8 in.-1⅜, plain. **Outside Millwork:** 72 lin. ft. dormer cornice; 186 lin. ft. main cornice; 1—10 ft. flower box; 5 wood brackets for above; 2—7 ft. flower boxes; 6 wood brackets; 2 lattice frames 2 ft. 6 in. x 7 ft. 0 in.; 4 porch posts; 30 ft. ceiling for entrance; 14 lin. ft. porch soffit and facias; 1 wood step. **Interior Doors:** 1—2 ft. 6 in. x 6 ft. 8 in.-1⅜, No. 720; 2—2 ft. 8 in. x 7 ft. 0 in.-1¾, No. 1605x; 2—2 ft. 6 in. x 7 ft. 0 in.-1⅜, No. 1102x; 3—2 ft. 6 in. x 7 ft. 0 in.-1⅜, No. 1102; 3—2 ft. 4 in. x 7 ft. 0 in.-1⅜, No. 1102; 3—2 ft. 6 in. x 6 ft. 8 in.-1⅜, No. 1102; 3—2 ft. 4 in. x 6 ft. 8 in.-1⅜, No. 1102. **Jambs:** 1—2 ft. 6 in. x 6 ft. 8 in.; 2—2 ft. 8 in. x 7 ft. 0 in., x; 2—2 ft. 6 in. x 7 ft. 0 in., x; 3—2 ft. 6 in. x 7 ft. 0 in.; 3—2 ft. 4 in. x 7 ft. 0 in.; 3—2 ft. 6 in. x 6 ft. 8 in.; 3—2 ft. 4 in. x 6 ft. 8 in. **Interior Trims:** 3 sides single trim 8 x 10-3L; 1 side twin trim 9 x 10-3L; 2 sides single trim 9 x 14-12L; 2 sides single trim 12 x 20-4L; 2 sides single trim 9 x 10-12L; 2 sides single trim 9 x 12-12L; 1 side single trim 8 x 12-16L; 2 sides mul. trim 8 x 10-6L casements; 1 side single trim 8 x 10-6L casements; 2 sides single trim 10 x 14-16L casements; 2 sides triple trim 8 x 14-8L casements; 1 side quadruple trim 8 x 14-8L casements; 1 side mul. trim 9 x 14-12L; 1 side door trim 3 ft. 0 in. x 7 ft. 0 in.; 1 side door trim 2 ft. 8 in. x 6 ft. 8 in.; 2 sides door trim 2 ft. 6 in. x 6 ft. 8 in.; 4 sides door trim 2 ft. 8 in. x 7 ft. 0 in.; 2 sides door trim 2 ft. 6 in. x 7 ft. 0 in.; 8 sides door trim 2 ft. 6 in. x 7 ft. 0 in.; 6 sides door trim 2 ft. 4 in. x 7 ft. 0 in.; 6 sides door trim 2 ft. 6 in. x 6 ft. 8 in.; 6 sides door trim 2 ft. 4 in. x 6 ft. 8 in.; 2—2 ft. 0 in. book cases; 1 mantel shelf; 1 linen closet; 2 medicine cabinets; 1 meter cabinet; 1 drain board; 1—8 ft. 6 in. counter; 1—2 ft. 6 in. kitchen cupboard; 1—3 ft. 0 in. kitchen cupboard; 1 corner seat; 1—3 ft. 0 in. kitchen cupboard; 1 table; 630 lin. ft. base; 630 lin. ft. base shoe; 630 lin. ft. base moulding; 160 lin. ft. ceiling cove; 320 lin. ft. picture moulding; 20 lin. ft. closet shelving; 20 lin. ft. closet hook strip; 10 lin. ft. closet clothes rod; 52 lin. ft. chair rail; 6 lin. ft. threshold; 1 flight basement stairs with rail; 1 flight main stairs with rail. **Note:** If trim is changed in dining room, living room and sun room, it will change the following items which are included in the above list: 2 sides single trim 10 x 14-16L; 2 sides triple trim 8 x 14-8L casements; 1 side quadruple trim 8 x 14-8L casements; 1 side mul. trim 9 x 14-12L; 1 door 3 ft. 0 in. x 7 ft. 0 in.-1¾ glazed; 2 doors 2 ft. 8 in. x 7 ft. 0 in.-1¾, No. 1605; 2 doors 2 ft. 6 in. x 7 ft. 0 in.-1⅜, No. 1102; 4 sides door trim 2 ft. 8 in. x 7 ft. 0 in.; 2 sides door trim 2 ft. 6 in. x 7 ft. 0 in.; 2 door jambs 2 ft. 8 in. x 7 ft. 0 in.; 2 door jambs 2 ft. 6 in. x 7 ft. 0 in.; 2—2 ft. 0 in. book cases; 1 mantel shelf; 134 lin. ft. base; 134 lin. ft. base shoe; 134 lin. ft. base moulding; 160 lin. ft. ceiling cove; 160 lin. ft. picture moulding; 1 side door trim 3 ft. 0 in. x 7 ft. 0 in.

TINWORK—43 lin. ft. ridge roll; 3 finials; 70 lin. ft. flashing tin; 300 tin shingles; 6 sheets sheet tin; 108 lin. ft. gutter; 18 gutter ends; 25 gutter hangers; 8 nipples; 8 offsets; 8 strainers; 8 elbows; 8 shut offs; 90 lin. ft. conductor; 24 conductor hooks; 3 flower box linings; 2 screened vents.

HARDWARE—5 cellar sash sets; 15 casement sets with butts; 13 sash locks; 13 sash lifts; 33 storm sash sets; 33 screen sets; 8 sets of shutter hardware for pairs; 1 front door set with butts; 1 rear door set with butts; 2 storm door sets; 2 screen door sets; 1 floor hinge; 2 push plates; 16 inside door sets with butts; 19 door bumpers; 3 dozen clothes hooks; 1 coal chute; 1350 lb. assorted nails; .8 lb. assorted brads; 390 lb. sash weights; 3 hanks sash cord; 2 sets book case hardware (4 pr. ornamental butts; 2 cupboard turns); 1 set linen cabinet hardware (2 pr. ornamental butts; 1 cupboard turn; 1 blind catch); (medicine cabinet: 2 pr. ornamental butts; 2 cupboard turns); (meter cabinet: 1 cupboard turn; 1 pr. ornamental butts); 4 stair rail brackets; 1 set hardware for kitchen counter (2 pr. ornamental butts; 1 cupboard turn; 1 blind catch; 1 drawer pull); 2 sets hdwe. for kitchen 3 ft. 0 in. cupboards (6 pr. ornamental butts; 3 cupboard turns; 3 blind catches); 1 set hdwe. for 2 ft. 6 in. kitchen cupboard (4 pr. ornamental butts; 2 cupboard turns; 2 blind catches).

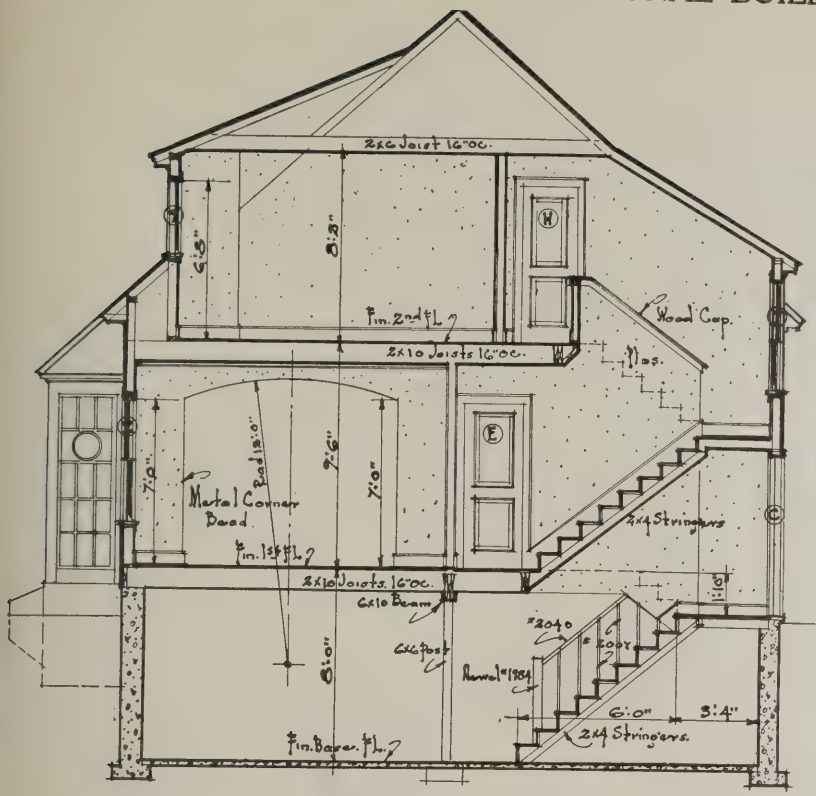
EXTERIOR PAINTING—16 gal. body paint; 5 gal. trim paint; 3 gal. boiled oil; 39 gal. shingle stain; ½ gal. sash color; 1 gal. screen paint; 1 gal. japan; 1 gal. turpentine; ½ gal. shellac; 15 lb. putty.

INTERIOR PAINTING—15 gal. white paint; 10 gal. enamel; 6 gal. filler stain; 3 gal. shellac; 14 gal. interior varnish; 5 gal. shellac for floors; 8 gal. floor varnish; 3 gal. oil; 2 gal. japan; 2 gal. turpentine; 2 gal. alcohol; 4 doz. sheets sandpaper; 4 lb. steel wool.

INSULATION—1900 ft. flaxlinum or equal for walls ½ in.; 700 ft. flaxlinum or equal for ceilings ½ in.; 4 rolls tar felt for roof; 4 rolls tar felt for walls; 3 rolls red rosin for floors.

WEATHER STRIPPING—5 sash 8 x 10-3L; 2 windows 10 x 14-16L; 10 windows 8 x 14-8L; 4 windows 9 x 14-12L; 2 windows 12 x 20-4L; 2 windows 9 x 10-12L; 1 window 8 x 12-16L; 5 windows 8 x 10-6L; 1 door 3 ft. 0 in. x 7 ft. 0 in.; 1 door 2 ft. 8 in. x 6 ft. 8 in.; 2 windows 9 ft. x 12-12L.

CAULKING—33 window openings; 2 door openings; 1 coal chute.



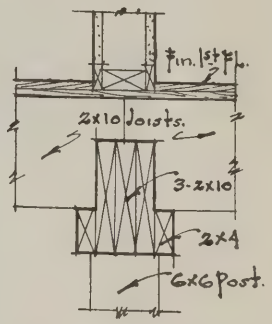
SECTION

Scale 1/4"=1'-0"

SCALE

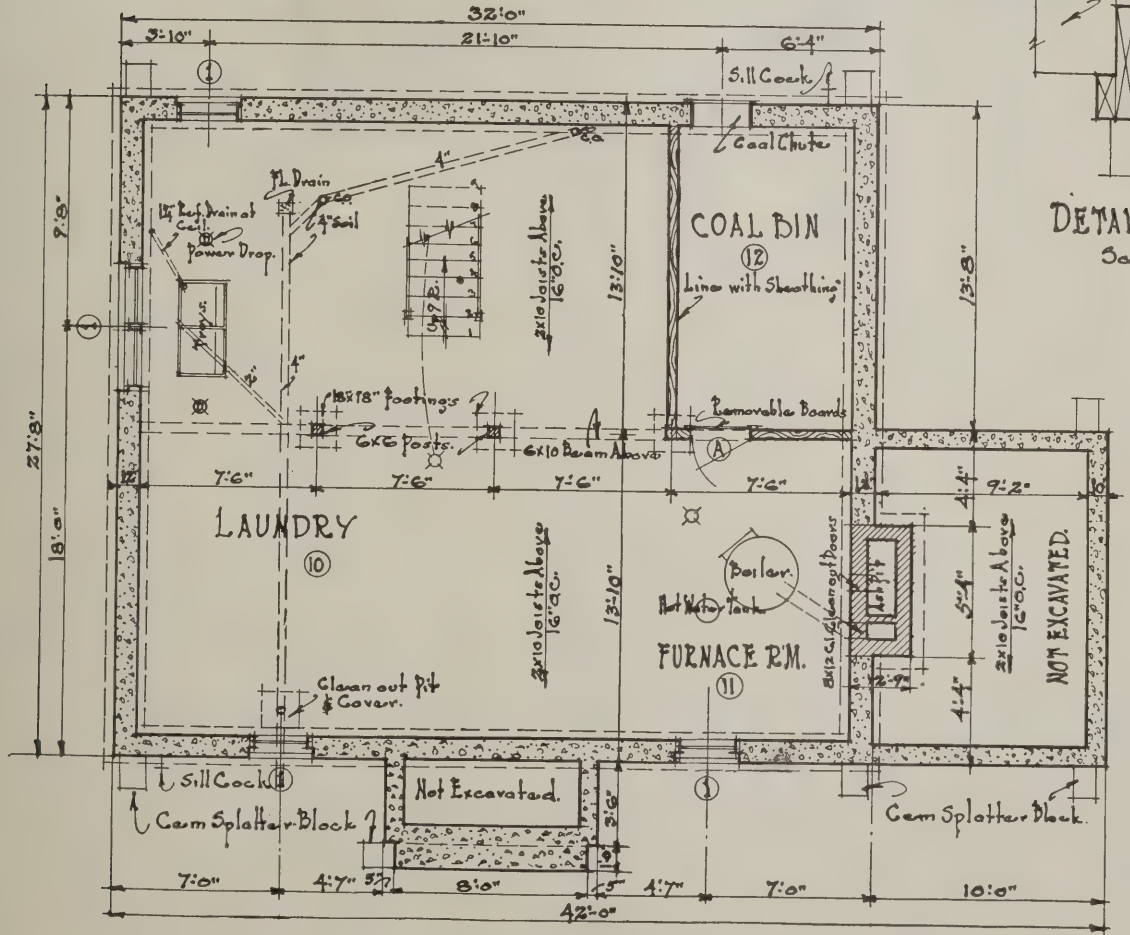
SCHEDULE OF WINDOWS							
QUANTITY	TYPE	DESCRIPTION	No. of Lights	Size Glass	Size of opng. for sash	Thickness sash	Frame
5	1	Basement.	3	8 X 10	2'-4" x 1'-3"	1 3/8"	See Detail.
2	2	Double Hung	16	10X14	3'-8 3/4" x 5'-2	"	"
10	3	Casement	8	8X14	2'-0" X 5'-2"	1 3/4"	"
4	4	Double Hung	12	9X14	2'-7 1/2" X 5'-2"	1 3/8"	"
2	5	"	4	12X20	2'-5" X 3'-10"	1 3/8"	"
2	6	"	12	9X10	2'-7 1/2" X 3'-10"	1 3/8	"
2	7	"	12	9 X12	2'-7 1/2" X 4'-8"	1 3/8"	"
1	8	"	16	8X12	3'-0 1/4" X 4'-6"	1 3/8"	"
5	9	Casement	6	8X10	2'-0" X 3'-2"	1 3/8"	"

SCHEDULE OF DOORS				
QUANTITY	TYPE	SIZE	DESCRIPTION	REMARKS.
1	A	2'-6"x 6'-8" x 1 3/8	UNIV. #720	5 Panel
1	B	3'-0"x 7'-0" x 1 3/4"	See Elev	Closed.
1	C	2'-8"x 6'-8"x 1 3/4	UNIV. #753	REAR.
2	D	2'-8" x 7'-0" x 1 3/4	" #1605	Interior.
5	E	2'-6" x 7'-0" x 1 3/8	" #1102	"
3	F	2'-4" x 7'-0" x 1 3/8	" #1102	"
3	G	2'-6" x 6'-8" x 1 3/8	" #1102	"
3	H	2'-4" x 6'-8" x 1 3/8	" #1102	"



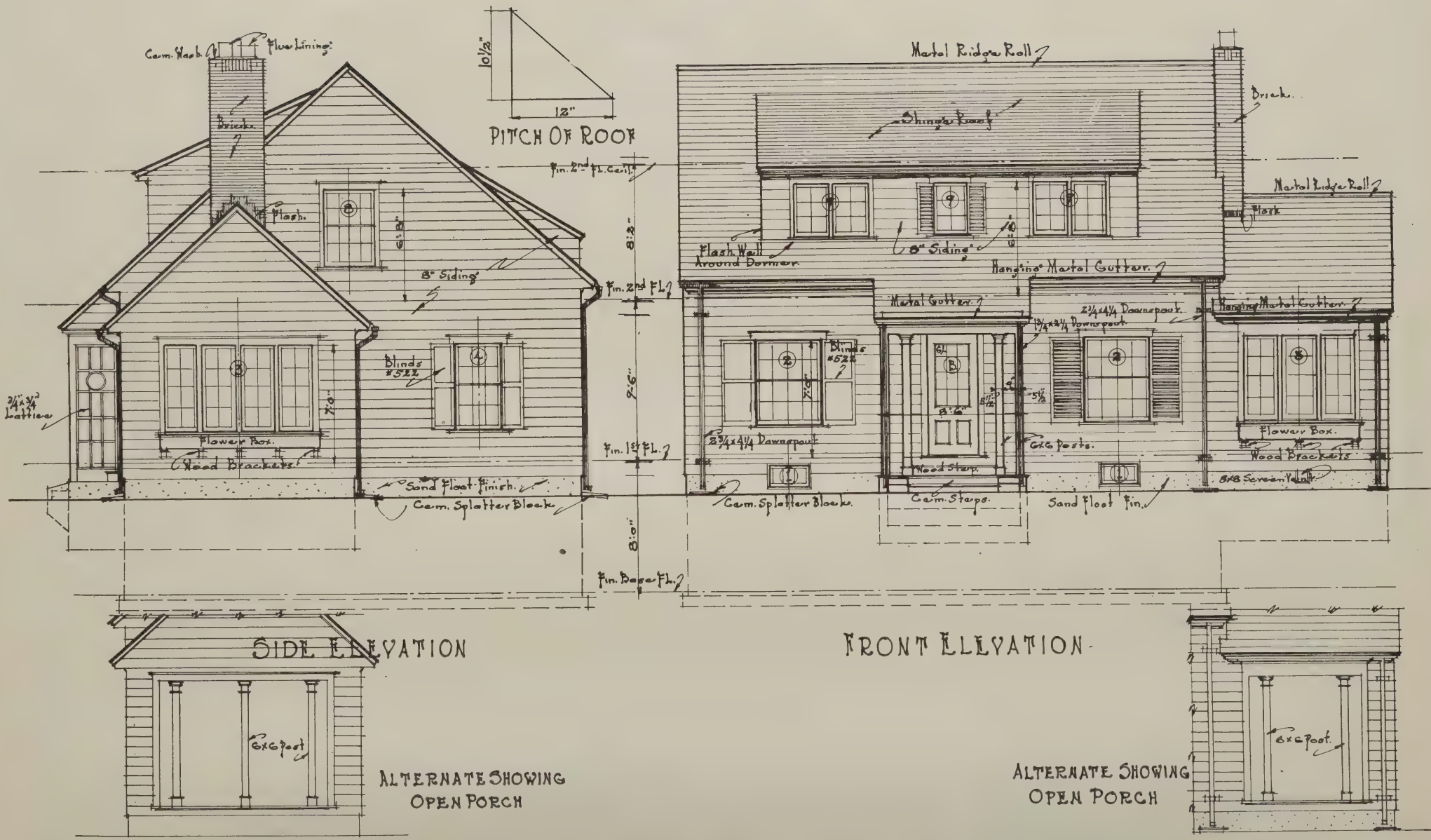
DETAIL OF BEAM

Scale 1 1/2"=1'-0"

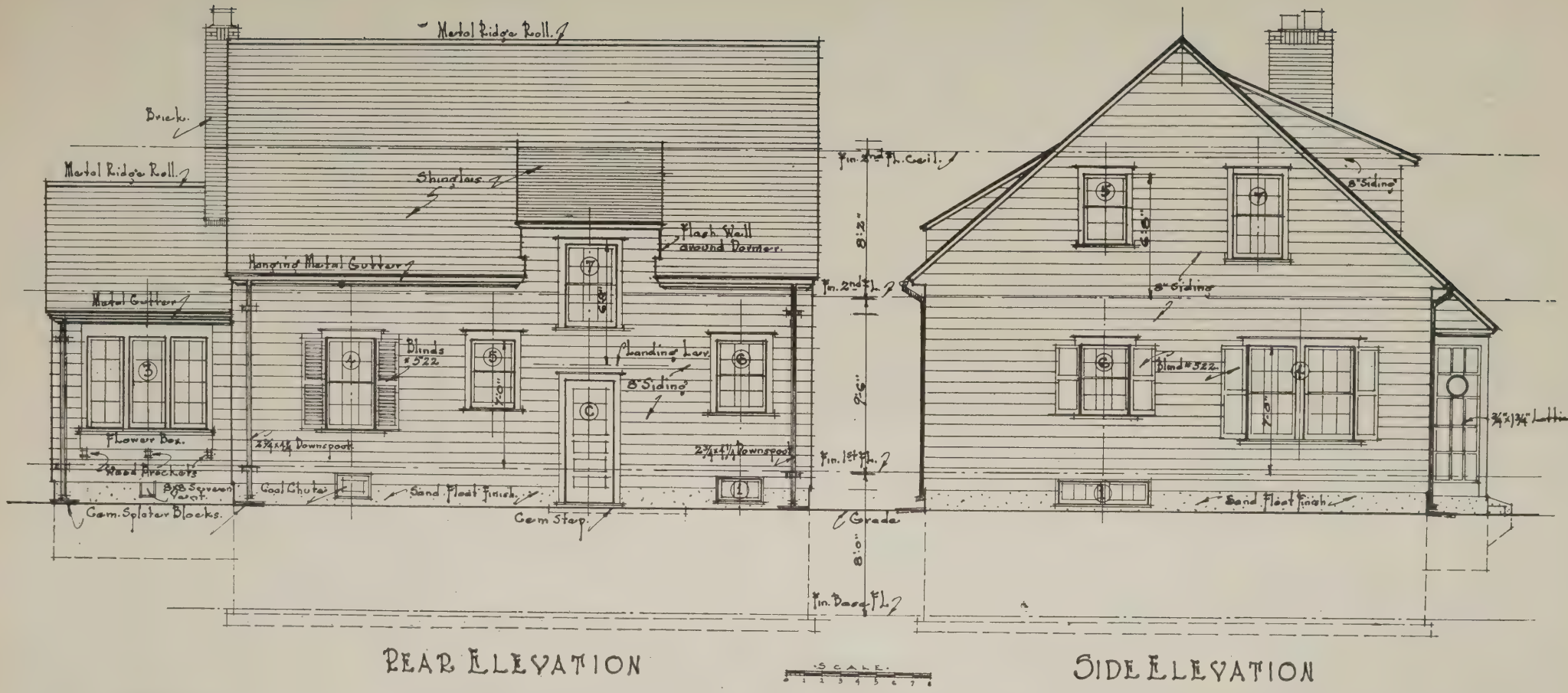


BASEMENT PLAN

Section and basement plan, House No. 6A48. Copyrighted by National Builder and The Architects'



Side and front elevation of House No. 6A48, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc. Copyrighted by National Builder and The Architects' Small House Service Bureau



Rear and side elevations of House No. 6A48, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc. Copyrighted by National Builder and The Architects' Small House Service Bureau

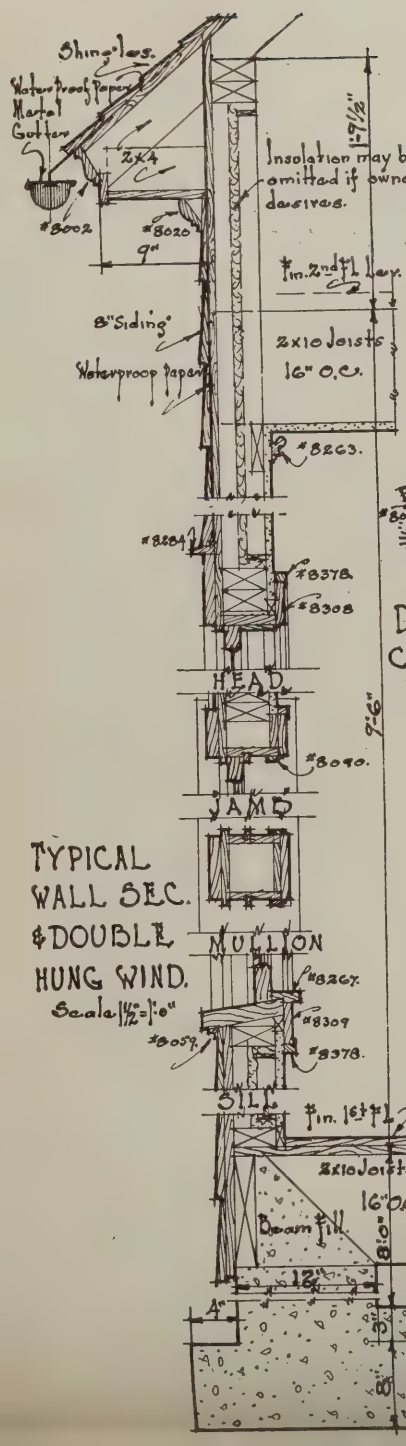
Dimensions are taken to outside of foundation walls, to outside of studs on exterior walls and center of studs for partitions.

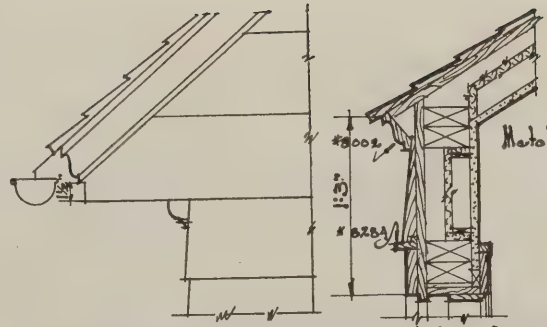
Foundation walls shown concrete may be stone, brick, concrete block or load-bearing hollow tile.

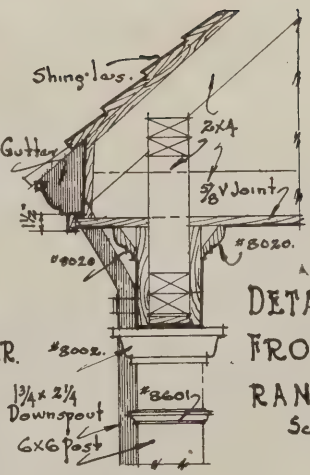
Where building ordinances permit, foundation walls may be 9 in. thick (with 20 in. x 9 in. footings) except in case of stone, which shall be 18 in. thick.

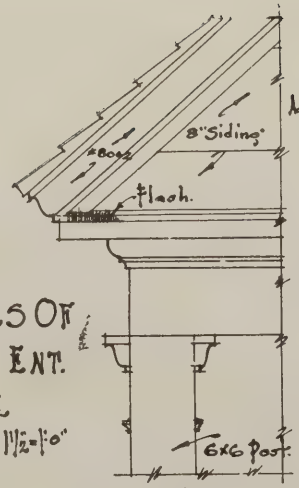
Stock numbers refer to mouldings in Curtis Millwork Design Book No. 400.. In case these mouldings can not be procured, others of similar design and size may be substituted.

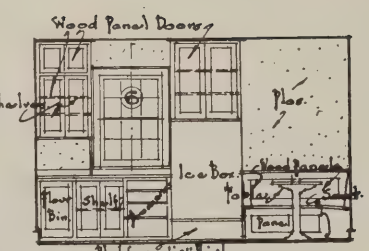
Provide 1⅛ ni. screen and storm sash for all exterior openings except ice door unless otherwise noted. Bottom rail of storm sash to have vent.

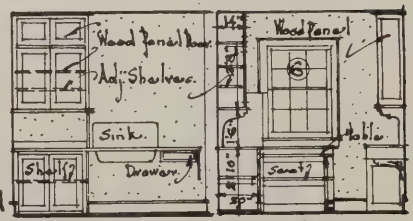


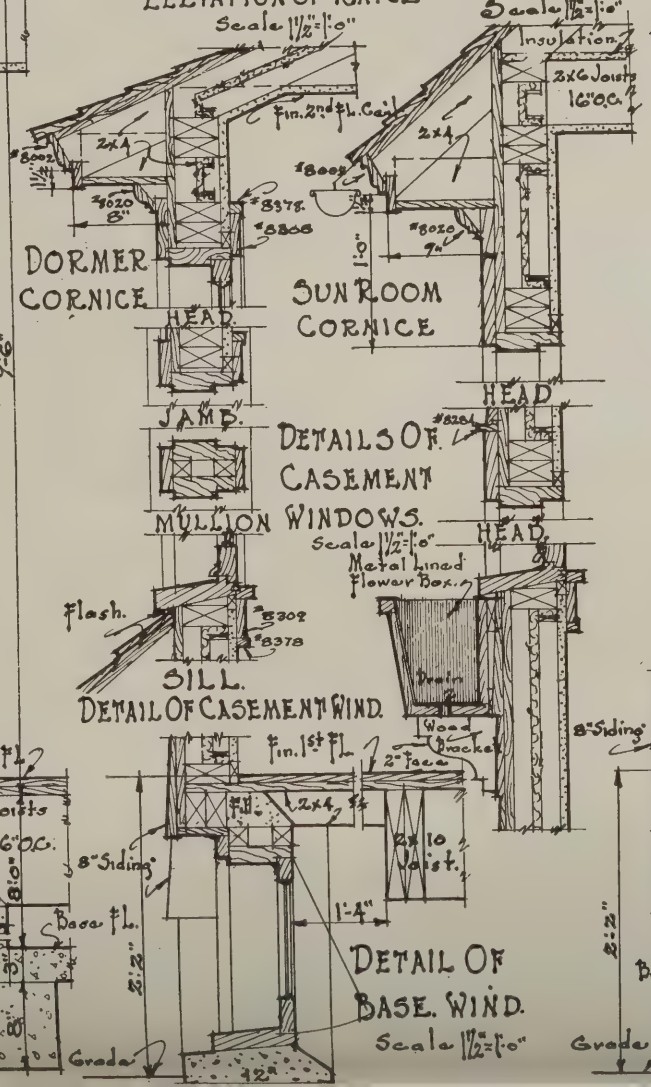


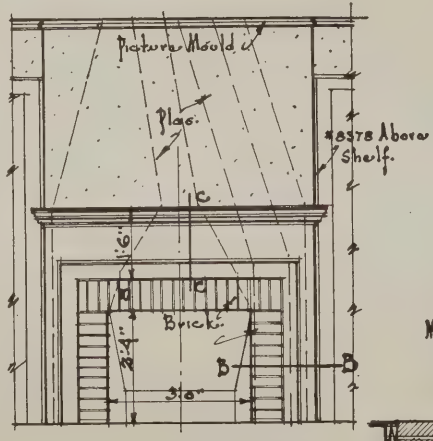


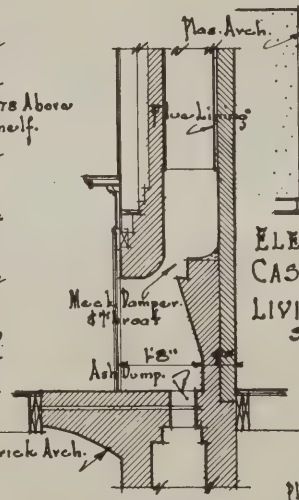


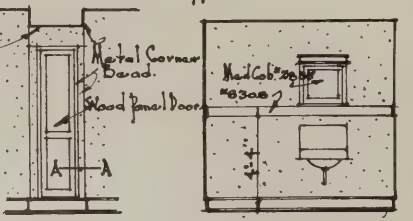


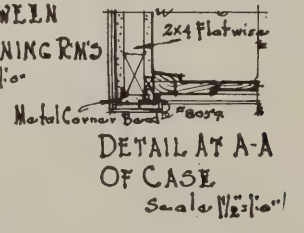


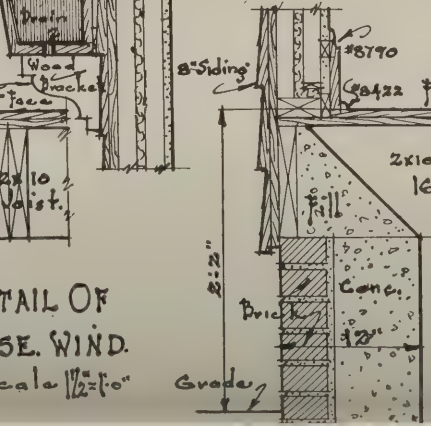


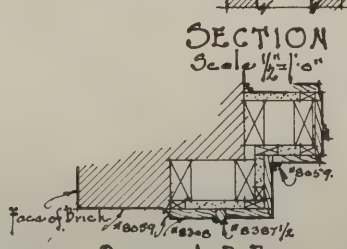


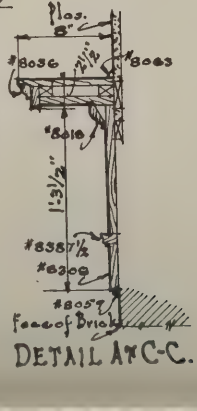












DETAILS OF FIREPLACE
Scale 1½"=1'-0"

Expense Analysis

No. 10.—Description of the Various Classifications of Expense—

By G. W. Hafner

THERE are certain expenditures that *must* be made, if the particular concern is to keep going and stay in business. It is easy for the contractor and builder to see where *some* of his money goes—in the purchase of material, labor, office salaries, rent and such like items which are obvious—but the universal experience is that it is hard for the average contractor to see where so much money goes as appears to sink out of sight. The usual question at the end of the year, with those who have no means of determining their costs, is, "Where have our profits gone?"

This is a question that has caused more ill feeling and more business heart breaks than almost anything else that enters into the operation of a business. There is something pathetic in the wild search that is so often made at the end of the year, for some large item, which supposedly *must* have been left out of the inventory, to account for the wide difference between actual and anticipated profits.

There are certain expenses of doing business that *must* be paid, and the individual contractor and builder cannot *afford* to overlook any of these in arriving at his costs. A list of the expenses that make up the costs in the construction industry, variously subdivided as to particular expense items, and as to departments of the business, was presented in a Chart of Expense Classification in the preceding issue. We have now to consider, in detail, the charges to each of the accounts shown thereon.

Labor—Foremen—Superintendent—Timekeeper—Watchman—Water Boy

While it is not at all possible to classify labor, in and of itself, as a commodity, attention is directed to the circumstance that it is purchased and paid for precisely like a commodity.

A ton of steel or a thousand brick are purchased at so much per ton or per thousand; an hour of labor at so much per hour. If the hour of labor is expended in handling the thousand brick, the cost of the brick is added to by the precise amount of money paid for the hour of labor. In other words, when the thousand brick are put into a job, the price received for them must be large enough to cover the first cost of the brick, plus the labor of handling, if it is expected to so much as break even on the deal. This will hold true, not alone with respect to labor, but also with respect to every other element of expense which affects contracting and building operations.

Labor expense is made up of all the miscellaneous labor employed in the business.

Maintenance

Maintenance represents the necessary expenditure in the way of upkeep. Repairs made to buildings, equipment, wagons and trucks, in order that their original efficiency may be maintained, together with other expenditures for feed, gasoline and oil, tires, veterinary services, etc., are all maintenance charges and should be charged to the various maintenance accounts as shown by the Chart of Expense Classifications.

Supplies—General

Supplies of all kinds used in the business are to be charged to this account.

Where a considerable stock of supplies are carried on hand for use as required, the amount involved should be carried as an asset, as an inventory classification.

Insurance

Insurance is a prepaid item, or deferred charge. The account in the General Ledger is known as "Unexpired Insurance."

Fire and tornado insurance is based on the valuation of buildings, equipment and merchandise on hand at a certain rate per $1,000.00 of value.

One-twelfth of the annual expirations on insurance will be charged, *monthly,* to "Fire and Tornado" insurance expense, and credited to "Unexpired Insurance" account in the General Ledger.

Compensation Insurance is a prepaid item. The account in the General Ledger is known as "Compensation Insurance Deposit," and generally includes both liability insurance and compensation insurance.

This insurance is based on a certain rate per $100.00 of payroll, the total payroll for six months, or a year, being estimated in advance, for the purpose of premium computation; later, when the actual amount paid in wages is determined, an adjustment is made as between the estimated and actual amount.

Each month the actual amount of labor consumed is computed at the compensation insurance rate or rates per $100.00. The result is charged to "Compensation" insurance expense and credited to "Accrued Compensation Insurance" account in the General Ledger. At the end of the six months or annual period, the "Compensation Insurance Deposit" account is balanced off against the "Accrued Compensation Insurance" account, and the difference, either debit or credit, represents the adjustment necessary to be made with the insurance company.

Taxes

This is an accrual (the reverse of a prepaid or deferred item) Liabilities accrued, but not due, are recorded, so that the charges represented by them may be taken into account as an expense during the period in which they originate.

A certain amount, therefore, based on the experience of past years, is credited to "Accrued Taxes" account in the General Ledger and charged to expense, *monthly.*

For example, if it were found that taxes to the amount of $1,200.00 had been paid the previous year, $100.00 would be accrued each month.

Taxes are assessed on the value of the land, buildings, equipment and merchandise; or, if the plant is rented, on equipment and materials only.

The amount varies, in different localities, with the tax rate applicable, and the date upon which liability for taxes arises depends upon the provisions of the statutes regulating the same.

Depreciation

Repairs alone will not keep buildings and equipment in their original condition. Inevitably the time comes when, no matter how carefully they have been repaired, a particular wagon, or truck, or any other piece of equipment must be *replaced* by a new one, and a particular building torn down and a new one erected.

Hence the need for what is termed "Depreciation." Over the years when the original building or equipment is in use, a sufficient sum *must* be set aside *yearly* to cover the cost of *replacement* with a new one.

There are four causes for depreciation:

1. Property depreciates as a result of its normal use.

2. Property depreciates as a result of age and physical decay.

3. Property depreciates due to the fact that certain of its component elements become inadequate to serve the purpose for which they were originally installed.

4. Property depreciates because certain of its parts, such as equipment, become obsolete.

The importance of this subject of depreciation can hardly be exaggerated. Any

proprietor or manager who loses sight of the fact that his equipment, *no matter how well it may be kept in repair,* is constantly lessened in value, will some day be confronted with a very serious problem.

An "Allowance for Depreciation" account is therefore set up for each class of permanent asset except land, into which is credited, *monthly,* one-twelfth of the annual depreciation of the asset, the corresponding debit being charged to the various classifications of "Depreciation" expense.

Rules for Maintenance and Depreciation

That the principles of maintenance and depreciation may be clearly grasped, the following rules are laid down:

1. The original cost of the asset, together with the repairs and upkeep of the asset, are a proper charge to expense *during the life of the asset.*

2. These two items of depreciation and maintenance must be so spread over the entire life of the asset, *to insure to each accounting period its proper proportion.*

Shed Construction

Materials and labor consumed in the erection of temporary sheds on building sites make up the total charge to this expense.

Rent

When office, stable and warehouse are rented, the rental charge is properly included as a part of the expense, and the proper proportion of such annual rental should be charged to expense, *monthly.*

In this case there would, of course, be no taxes, insurance, or depreciation to be figured on the buildings.

In this connection attention is directed to the fact that insurance, taxes, depreciation and repairs on buildings owned by contractors take the place of rental.

Team and Truck Hire

This expense comprises all expenditures for teaming or hauling done by other than the teaming equipment owned by the business.

Executive Salaries

The salaries paid to executives, managers or *proprietors* make up this expense.

It should not be overlooked that, even though a particular business is being operated as a sole proprietorship, or as a copartnership, the proprietor or prorietors should charge to expense, monthly, the amount of money they withdraw from the business.

Office Salaries

This expense is made up of all salaries paid to office or clerical help, and is wholly an office and administrative charge.

Commissions

When commissions are paid to salesmen (or to agents), the amount of such commissions, *as they accrue,* make up the total of this expense.

Note the phrase, "as they accrue." By this is meant that this expense should not be charged with commissions *when such commissions are paid;* but rather that commissions should be figured monthly. "Accrued Commissions" account in the General Ledger credited with the total amount of commissions *due,* and the corresponding charge made to expense. When payment is made, "Accrued Commissions" account is charged.

Architects Fees

This expense is made up of any and all fees paid to architects.

Auto Expense

This expense is made up by expenditures for gasoline, oil, tires, repairs, etc., for automobiles operated by the business.

In most cases it is a selling expense, and has been so shown on the Chart of Expense Classifications.

Advertising

All expenditures for advertising make up the total of this expense.

By advertising is meant such copy, signs, or other media as may be prepared and used for the purpose of keeping the public informed as to your ability to serve them —in other words, any space which is used for general publicity purposes.

Help wanted advertisements, space paid for in church or charity organization publications, and the like, should *not* be charged to this account.

Traveling Expense

All railroad and pullman fares, taxi or bus fares, hotel bills, meals, tips—in short, all general out-of-pocket expenditures made by executives and salesmen in traveling are included in this expense.

Postage

This expense is made up of all postage purchased.

Telephone and Telegraph

All telephone bills, and the cost of all telegrams make up the total of this expense.

Care should be exercised to see that the current month's bills for telephone and telegrams are charged to this expense for the same month.

Water, Fuel and Light

This is made up of all bills for water, fuel and light.

In the case of fuel used from a supply on hand, some means should be taken of determining the value of the fuel so used each month, in order that credit may be passed to the "Inventory" account, and the corresponding charge made to expense.

Power

All bills for power purchased should be charged to this account.

Collections, Credit and Exchange

Any and all expenses incurred in securing credit information; subscriptions to Dun, Bradstreet or other mercantile agencies, together with the payment of exchange rates, should be charged to this account.

Legal and Professional Services

This expense is comprised of attorney's fees, auditors and accountants' fees, and the expenditures in connection with any other professional service.

Bad Debts

Considering that losses from bad debts or uncollectible accounts during the last decade have approximated two billion dollars, the business man who does not include losses of this character in his expenses is much more of an optimist than he can well afford to be.

Business as a whole is done on a credit basis; and, due to the very nature of credit extension, every concern has some uncollectible accounts.

Provision for such bad debts should be made each month by crediting "Allowance for Doubtful Accounts" account in the General Ledger and charging "Bad Debts" expense with the estimated monthly loss due to uncollectible accounts. This estimate is based upon the experience of past years.

As soon as an account is known to be irretrievably bad, it is written off against the "Allowance for Doubtful Accounts" account.

Unclassified

This is not intended, and should not be used, as a dumping place for miscellaneous expenses. All expenses should be closely analyzed and charged to the various subclassifications provided by "Chart of Expense Classifications."

This means that practically all of the miscellaneous items making up the total expense can and should be charged to some particular expense classification.

However, there will be, in most cases, some expense, *negligible in amount,* for which no specific account has been provided. Such items are to be charged to "Unclassified."

Non-Operating Expenditures

It should be borne in mind that the expenses incurred in the *operation* of a business should not be confused with any other expenditures.

For this reason interest on borrowed money, or cash discounts to customers, are not considered as expenses which affect costs, since such disbursements represent charges against income.

Conversely, interest on bank balances, purchase discounts, dividends from securities, and the like should not be treated as income derived from the merchandising activities of the business, but as income from capital.

The next succeeding article will deal with the proper basis for correctly distributing expenses to the various departments of the business.

Steel-Frame Corrugated Siding Barn

A Lightning and Fire-Proof Structure at Low Cost

By Fred C. West

THE barn pictured here is made of steel throughout. Not a piece of wood enters into its construction. It is economically made. It will last a lifetime—plus. It is fireproof; built like a factory. It is the latest thing in barns.

This barn was designed and fabricated by the Continental Bridge Co. of Chicago for John D. Cole, a farmer living five miles south of Mulliken, Mich.

Mr. Cole's idea was to build an absolutely fireproof steel barn with unobstructed clearance in the haymow. The completed experiment unquestionably embodies all the desirable features of barn building, including in addition to those just mentioned, unlimited life, limited construction cost, and negligible upkeep.

The steel frame is of three-hinge arch construction. The trusses are supported at three points only—center, and bottom on each side. There are no interior posts nor obstructions of any description. The steel frame is very rigid and comparatively light. This barn is 36x72 ft., with a 12-ft. concrete basement stable. The haymow above rises 34 ft. to the hay carrier.

Four large entrance doors 14x16, weighing approximately 800 lb. each, are supported by Richards-Wilcox sliding door hangers.

The steel framework takes up less room inside than the wooden beam construction, giving more storage space, and easy accessibility for handling hay.

The structural steel for this barn was delivered on the farm all fabricated in such manner that it was erected at a very small cost. No framing nor work of that kind was necessary, except the bolting together of the different pieces.

Fire is a hazard of barn construction that has never before been successfully precluded. It is safe to say that 90 per cent of barn fires are caused from outside sources, and not from interior fires. A barn built as this one, of steel construction and covered with corrugated metal, is practically immune from lightning if properly grounded. Therefore, the barn is absolutely fireproof from that point of view.

The deleterious effect of weather from which barns have always suffered in the past has also been practically eliminated by this factory-made barn. The corrugated metal envelope of the structure is copper alloy, practically impervious to weather, and does not need painting until after about five years. The life of the barn, if the interior steel work and exterior corrugated covering are kept properly painted, is unlimited.

The windows are also fireproof and long-lived. The sashes are metal, glazed with ¼-in. factory-ribbed wire glass.

The design of the barn can be suited to the requirements of the builder, so far as handling of hay is concerned. The structure pictured in the accompanying illustrations was designed to accommodate the handling of hay through the center doors. If it is desired to build a similar barn, with the intention of handling the hay through the ends of the barn, that can be readily accomplished, the designers state.

Wind loads are provided for in the design of the barn. The fact that the construction of the roof makes it impossible for snow to accumulate on it makes unnecessary any further provision in the designing of the structure to support a great snow load. The small amount of snow that remains on the barn is evident from the photos, which show considerable snow on the ground about the building, and none on the roof.

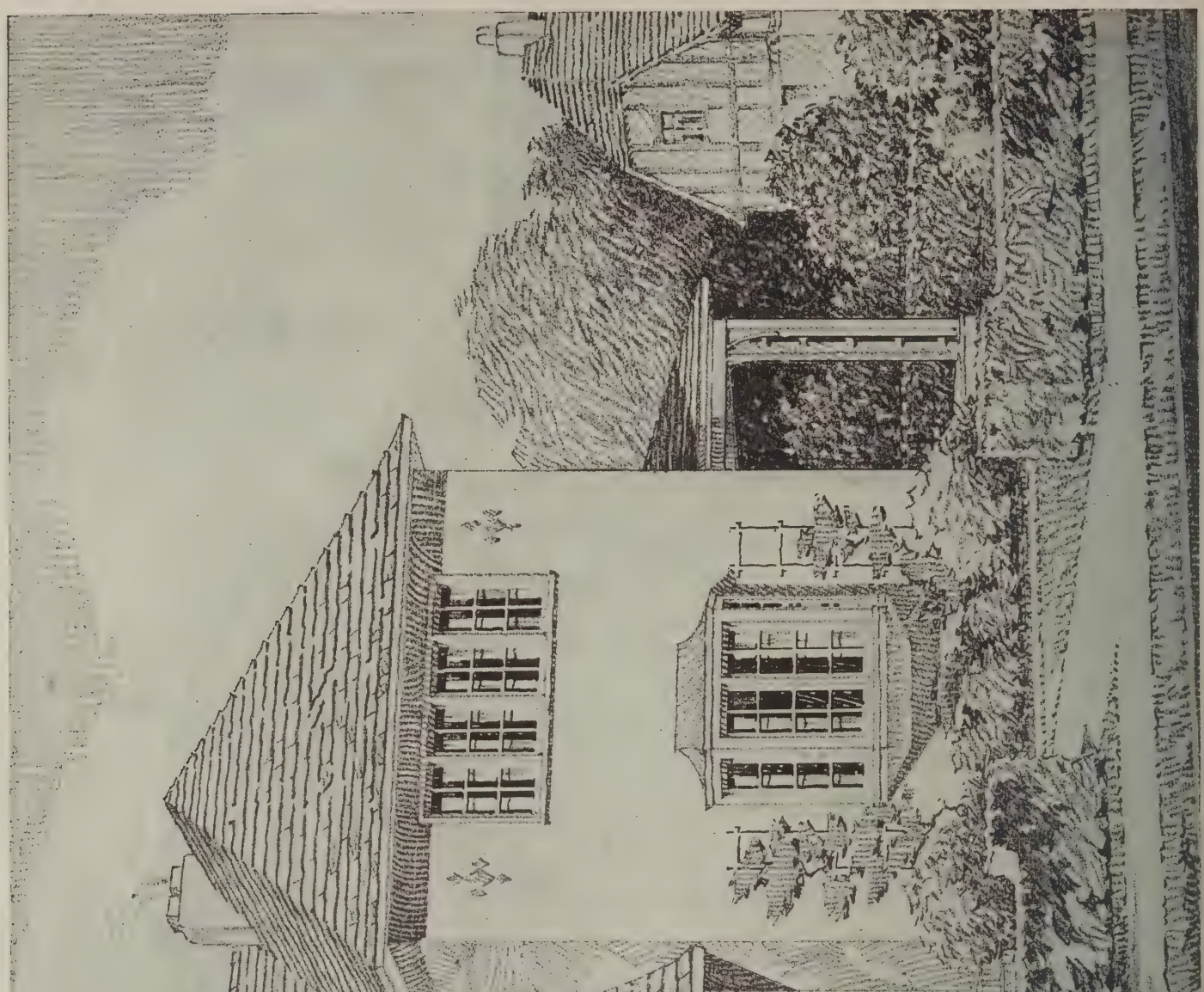
To enter the barn, concrete ramps or graded ramps may be built to accomodate teams and trucks, provided the contour of the ground is such that the basement stock stable cannot be set down low enough. In this particular instance, there happened to be a knoll that the farmer graded through so he had a natural grade and did not have to grade up.

Four men erected this barn with the help of a foreman. The cost was a surprise to everyone concerned. When a local building material man at Mulliken came out to Mr. Cole's farm to see the new barn, he and Mr. Cole became interested in determining just how the cost of the steel barn compared with wooden construction of a similar building. The result surprised both of them. It seemed impossible that a steel barn could be erected for less than a wooden barn, and the building material man went over his figures again. His figures were correct.

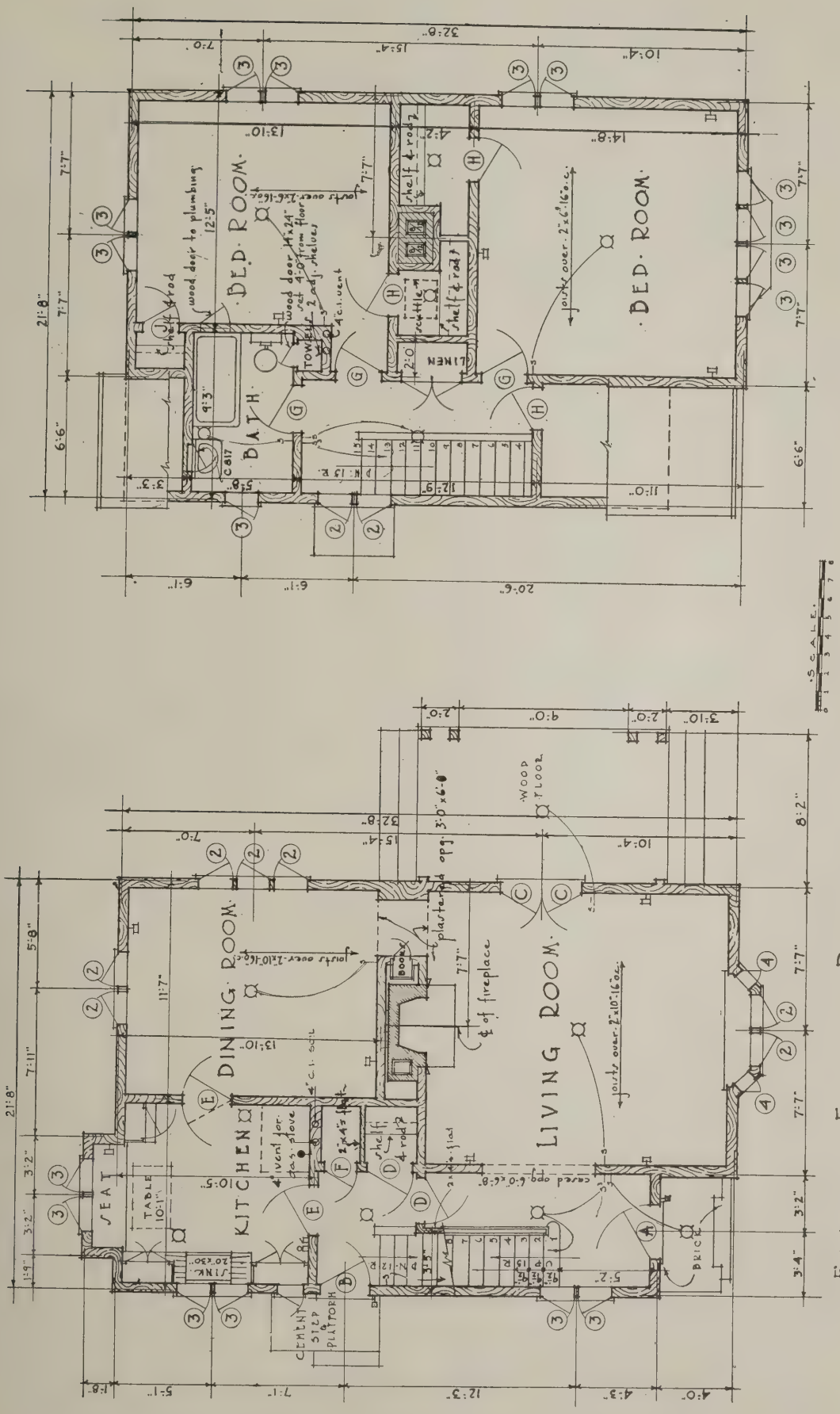
Local building contractors may find the time coming when it will pay them to become agents and erectors for steel-barn manufacturers.

Three-hinged steel-arch roof

All-steel fireproof barn



House No. 5A52, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc. Copyrighted



Floor plans of House No. 5A52, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc. Full construction details on the accompanying pages. Copyrighted by National Builder and The Architects' Small House Service Bureau

Two-Story English House No. 5A52

HERE is an attractive, full two-story five-room home in the English style, especially designed to be built on a narrow city lot. It can be built on a 30-ft. lot.

The outside dimension across the front is 22 ft. without the porch, but with the porch, as shown in the illustration, it is 29 ft. 10 in. The depth is 32 ft. 8 in. If the porch is omitted or placed at the rear this house can be built on a 30-ft. lot. Otherwise it will re quire a 40-ft. frontage.

A feature of this design is the great flexibility offered by the porch and the opportunity this presents to adapt the plan to different requirements. The working drawings include special details for a glazed porch if this should be preferred in place of the open one. Special drawings for a sleeping porch on the second floor are also furnished.

The living room is exceptionally pleasing with its bay window, fireplace and double French doors to the porch. An archway separates living and dining room, with a bookcase built in beside the fireplace.

In addition to the dining room this plan provides a dining alcove in the kitchen with a seat built into the niche.

Closet space is abundantly provided. The coat closet is conveniently placed in the front hallway. There is a broom closet near the kitchen door. The rear bedroom has two closets, and there is an enormous closet in the front bedroom, linen closet in the hall, towel closet in the bathroom and extra storage under the roof.

The regular price of this plan is $25 (to NATIONAL BUILDER subscribers $12.50).

EXCAVATING—180 cu. yd.

BACKFILLING—36 cu. yd.

FOUNDATION—If 12-in. concrete, 43 cu. yd. gravel, 174 sax cement; if 9-in. concrete, 34 cu. yd. gravel, 138 sax cement; if 12-in. tile, 20900 CBM tile, 16 cu. yd. mortar; if 9-in. tile, 16600 CBM tile, 13 cu. yd. mortar; 1050 face brick.

CEMENT FLOOR—4 cu. yd. gravel; 4 cu. yd. sand; 50 sax cement.

CHIMNEY—3000 common brick; 120 face brick; 100 fire brick; 26 sq. ft. hearth tile; 220 inside face brick; 60 lin. ft. 8x12 flue tile; 20 lb. fire clay; 3 cu. yd. mortar; 1 cast-iron ash dump; 1 throat and damper; 1 angle 4x3x5/16; 2 10x8 clean outs; 2 adjustable thimbles; 5 yd. metal lath.

LATH—8750 M lath wood; 220 yd. lath metal for stucco.

PLASTER—620 sq. yd. plaster on wood lath; 16 sq. yd. Keene's cement; 220 sq. yd. stucco.

TILE FLOORS—44 sq. ft. ceramic tile; 26 lin. ft. cove base; 10 tile inserts.

LUMBER—3—6x6-7 posts; 1—4x6-7 posts; 1—6x8-22 girder; 1—6x8-14 girder; 1—6x6-8 girder; 3—2x10-14 stair stringers; 54 lin. ft. 2x4 basement partition plates; 14—2x4-7 basement partition studs; 180 ft. D & M basement partition shtg.; 7—2x6-14 porch joist; 3—2x10-7 first floor joist; 18—2x10-14 first floor joist; 10—2x10-22 first floor joist; 5—2x10-16 first floor joist; 90 lin. ft. 2x10 box sill; 2—2x6-8 box sill; 160 lin. ft. 1x3 bridging; 770 ft. com. bds. 1st floor subfloor; 358 ft. 13/16x1½ finish floor in living room; 252 ft. 13/16x1½ finish floor in dining room; 190 ft. 13/16x1½ finish floor in kitchen; 125 ft. 13/16x 1½ finish floor in back hall; 106 ft. 13/16x1½ finish floor in front hall; 140 ft. ⅞x4 finish floor on porch; 130 ft. ⅝x4 ceiling on porch; 300 ft. com. bds. grounds; 60 lin. ft. 1x4 ribbon; 3—2x 12-18 stair horses; 198 lin. ft. 2x4 first floor partition plates; 66—2x4-8 first floor partition studs; 3—2x10-16 first floor headers; 3—2x4-16 first floor partition headers; 2—2x4-6 second floor joist; 18—2x10-14 second floor joist; 12—2x10-22 second floor joist; 5—2x10-16 second floor joist; 730 ft. com. bds. second floor subfloor; 920 ft. 13/16x 1½ second floor finish floor; 234 lin. ft. 2x4 second floor partition plates; 69—2x4-8 second floor partition studs; 12—2x4-8 porch ceiling joist; 2—2x8-14 porch girders; 4—2x8-8 porch girders; 17—2x6-14 second floor ceiling joist; 10—2x6-22 second floor ceiling joist; 5—2x6-16 second floor ceiling joist; 720 ft. D & M attic floor; 330 lin. ft. 2x4 outside wall plates; 110—2x4-18 outside wall studs; 24 lin. ft. 1x8 ridge rafter; 25—2x4-16 lookouts; 4—2x4-14 headers; 1—2x6-14 headers; 64—2x4-12 rafters; 2—2x4-18 valley rafters; 5—2x4-16 rafters; 1380 ft. com. bds. roof shtg; 11 M shingles; 2200 ft. shiplap outside wall sheathing; 25—2x4-16 scaffold and extras; 6—2x6-14 scaffold and extras; 4—2x8-16 scaffold and extras; 5—2x10-16 scaffold and extras.

MILLWORK—Frames: 4 single frames 8x10-3L-1⅜; 1 twin frame 8x10-3L-1⅜; 3 mul. casement fr. 9x12-8L-1⅜; 1 triple casement fr. 9x12-8L-1⅜; 6 mul. casement fr. 9x12-6L-1⅜; 1 quadruple casement fr. 9x12-6L-1⅜; 1 single casement fr. 9x12-6L-1⅜; 2 single casement fr. 9x12-4L-1⅜. **Windows:** 6 sash 8x10-3L-1⅜; 9 casements 9x12-8L-1⅜; 17—9x12-6L-1⅜; 2—9x12-4L-1⅜. **Storm Sash:** 6—8x10-3L-1⅛; 9—9x12-8L-1⅛; 17—9x12-6L-1⅛; 2—9x12-4L-1⅛. **Screens:** 6—8x10-3L-1⅛; 9—9x12-8L-1⅛; 17—9x12-6L-1⅛; 2—9x12-4L-1⅛. **Outside Door Frames:** 1 dr. fr. 3 x 7 ft., 1¾ round head; 1 dr. fr., 2 ft. 8 in. x 6 ft. 8 in., 1¾ round head; 1 dbl. fr. for 2 doors, each 2 ft. 2 in. x 6 ft. 8 in., 1¾ round head; 1 icing door frame. **Outside Doors:** 1—3 x 7 ft., 1¾ round head; 1—2 ft. 8 in. x 6 ft. 8 in., 1¾ round head; 2—2 ft. 2 in. x 6 ft. 8 in., 1¾ C-321; 1 icing door; **1 astragal. Storm Doors:** 1—3 x 7 ft., 1⅛ round head; 1—2 ft. 8 in. x 6 ft. 8 in., 1⅛ round head; 1 pr. st. dr. 2 ft. 2 in. x 6 ft. 8 in. each. **Screen Doors:** 1—3 x 7 ft., 1⅛ round head; 1—2 ft. 8 in. x 6 ft. 8 in., 1⅛ round head; 1 pr. sc. drs. 2 ft. 2 in. x 6 ft. 8 in. each. **Outside Millwork:** 194 lin. ft. cornice; 2 lattice panels, 1 x 8 ft.; 4 porch posts; 2 half posts; 6 porch brackets; 2 front entrance brackets; 2 rear entrance brackets; 12 lin. ft. base; 2 set porch steps. **Interior Doors:** 2—2 ft. 4 in. x 6 ft. 8 in., 1¾ C304; 2—2 ft. 8 in. x 6 ft. 8 in., 1¾ C304; 1—1 ft. 8 in. x 6 ft. 8 in., 1¾ C304; 3—2 ft. 6 in. x 6 ft. 6 in., 1⅜ C304; 3—2 ft. 4 in. x 6 ft. 6 in., 1⅜ C304; 1—2 ft. x 6 ft. 6 in., 1⅜ C304; 1—2 ft. 6 in. x 6 ft. 6 in., 1⅜ C310. **Jambs:** 2—2 ft. 4 in. x 6 ft. 8 in.; 2—2 ft. 8 in. x 6 ft. 8 in.; 1—1 ft. 8 in. x 6 ft. 8 in.; 3—2 ft. 6 in. x 6 ft. 6 in.; 3—2 ft. 4 in. x 6 ft. 6 in.; 1—2 ft. x 6 ft. 6 in.; 1—2 ft. 6 in. x 6 ft. 6 in.; 1—6 ft. x 6 ft. 8 in. **Interior Trim:** 4 sides single trim 8 x 10-3L; 1 side twin trim 8 x 10-3L; 3 sides mul. casement trim 9 x 12-8L; 1 side triple casement trim 9 x 12-8L; 6 sides mul. casement trim 9 x 12-6L; 1 side quadruple casement trim 9x12-6L; 1 side single casement trim 9 x 12-6L; 2 sides single casement trim 9 x 12-4L; 1 side door trim 3 ft. x 7 ft.; 1 side door trim 2 ft. 8 in. x 6 ft. 8 in.; 1 side double-door trim, each door 2 ft. 2 in. x 6 ft. 8 in.; 1 side icing door trim; 4 sides door trim 2 ft. 4 in. x 6 ft. 8 in.; 4 side door trim 2 ft. 8 in. x 6 ft. 8 in.; 2 side door trim 1 ft. 8 in. x 6 ft. 8 in.; 6 side door trim 2 ft. 6 in. x 6 ft. 6 in.; 6 side door trim 2 ft. 4 in. x 6 ft. 6 in.; 2 side door trim 2 ft. x 6 ft. 6 in.; 2 side door trim 2 ft. 6 in. x 6 ft. 6 in.; 2 side opening trim 6 ft. x 6 ft. 8 in.; 1 scuttle door jamb; 1 scuttle door; 1 side trim; 1 mantel shelf; 1 flight basement stairs; 1 flight main stairs with rail; 1—6 ft. bay seat; 2 drain boards; 1—3 ft. kitchen cupboard; 1—2 ft. 6 in. kitchen cupboard; 1—3 ft. 4 in. kitchen table; 1—5 ft. 6 in. kitchen seat; 1—2 ft. kitchen cabinet; 1 medicine cabinet No. C817; 1 utility door; 1 utility door jamb; 1 side trim; 1 towel cabinet; 1 linen cabinet; 1 bookcase; 63 lin. ft. living room base; 63 lin. ft. living room base shoe; 63 lin. ft. living room base mldg.; 48 lin. ft. dining room base; 48 lin. ft. dining room base shoe; 48 lin. ft. dining room base mldg.; 400 lin. ft. base, balance of house; 400 lin. ft. base shoe, balance of house; 400 lin. ft. base mldg., balance of house; 112 lin. ft. ceiling cove; 220 lin. ft. picture moulding; 20 lin. ft. closet shelving; 20 lin. ft. closet hook strip; 10 lin. ft. closet clothes rod; 12 lin. ft. threshold; 1 meter cabinet.

HARDWARE—6 cellar sash sets; 28 casement sash sets; 34 storm sash sets; 34 screen sash sets; 1 front door set with butts; 1 rear door set with butts; 1 double door set with butts; 1 icing door set with butts; 2 storm door sets for single doors; 1 storm door set for double doors; 1 screen door set for double doors; 2 screen door sets for single doors; 1 floor hinge; 2 push plates; 12 inside door sets with butts; 17 door bumpers; 3 dozen clothes hooks; 4 stair rail brackets; 1 pr. hinges for scuttle door; 1300 lb. assorted nails; 6 lb. assorted brads; 1 coal chute; 1 drain board bracket; (kitchen cabinet: 2 pr. ornamental butts, 1 blind catch, 1 cupboard turn); (kitchen cabinet: 3 pr. ornamental butts, 3 cupboard turns); (kitchen cabinet: 5 pr. ornamental butts, 5 pr. cupboard turns, 4 blind catches, 4 drawer pulls); (linen cabinet: 1 cupboard turn, 1 blind catch, 4 drawer pulls, 2 pr. ornamental butts, 4 friction stays—utility door); (medicine cabinet: 1 pr. ornamental butts, 1 cupboard turn); (towel cabinet: 1 cupboard turn, 1 pr. ornamental butts); (bookcase: 1 cupboard turn, 1 pr. ornamental butts); 26 lin. ft. band moulding.

TINWORK—24 lin. ft. ridge roll; 3 finials; 10 lin. ft. chimney flashing; 28 lin. ft. valley; 40 lin. ft. flashing; 78 lin. ft. hip roll; 151 lin. ft. gutter; 50 gutter hangers; 8 outside miters; 5 nipples; 5 strainers; 4 offsets; 5 elbows; 4 shutoffs; 10 gutter ends; 72 lin. ft. conductor; 20 conductor hooks.

INSULATION—1900 ft. flaxlinum, or equal, for walls ½ in.; 650 ft. flaxlinum, or equal, for second floor ceiling ½ in.; 4 rolls waterproof paper for walls; 4 rolls felt for roof; 3 rolls rosin for floors.

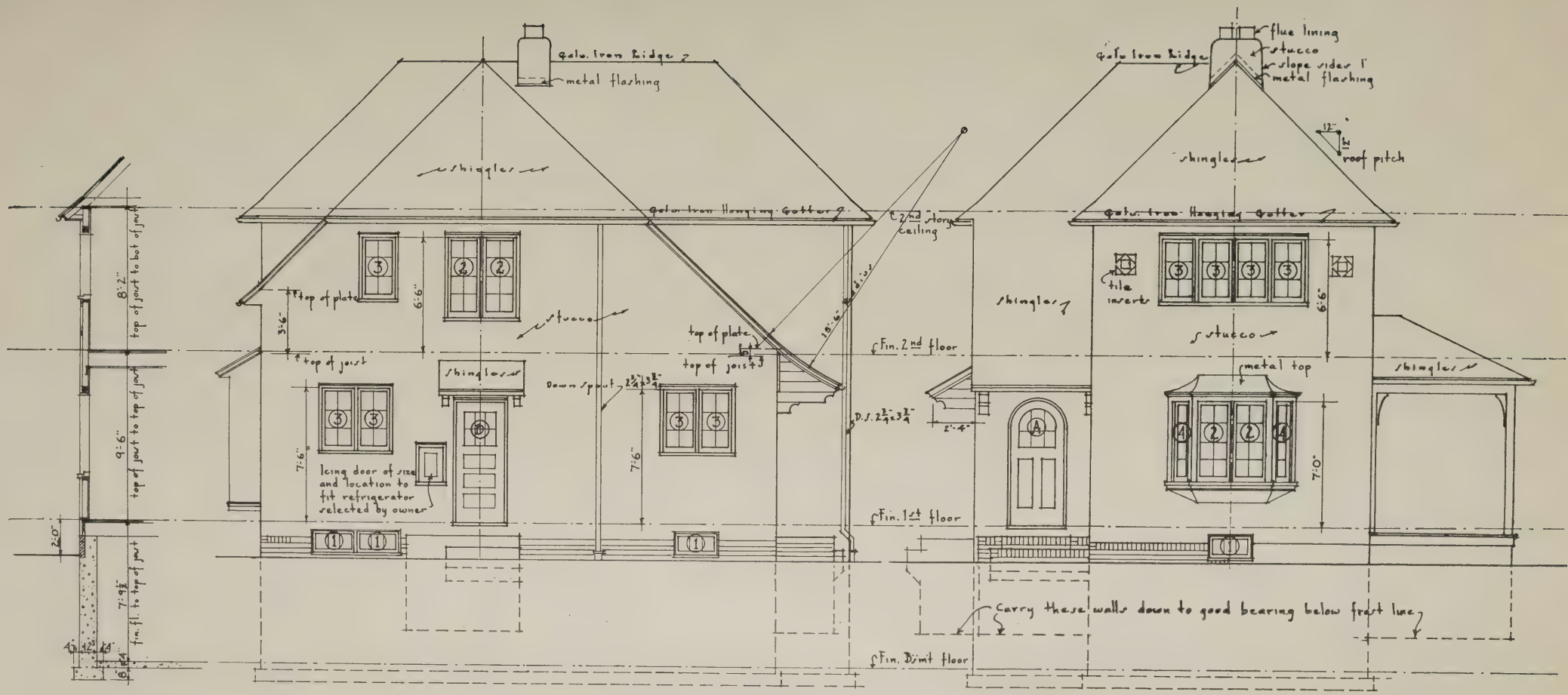
EXTERIOR PAINTING—33 gal. shingle stain; 6 gal. trim paint; 2 gal. boiled oil; 1 gal. porch floor; 1 gal. screen paint; 1 gal. sash color; 1 gal. Japan; 10 lb. putty.

INTERIOR PAINTING—15 gal. white paint; 10 gal. enamel; 7 gal. filler stain; 3 gal. shellac; 14 gal. interior varnish; 4 gal. shellac for floors; 7 gal. floor varnish; 2 gal. oil; 1 gal. Japan; 2 gal. turpentine; 1 gal. alcohol; 4 doz. sheets sandpaper; 4 lb. steel wool.

WEATHER STRIPPING—2 casements 9 x 12-4L; 6 sash 8 x 10-3L; 9 casements 9 x 12-8L; 17 casements 9x12-6L; 1 dr. 3 ft. x 7 ft.; 1 dr. 2 ft. 8 in. x 6 ft. 8 in.; 1 double-door opening 4 ft. 4 in. x 6 ft. 8 in.; 1 icing door.

CAULKING—34 window openings; 2 single-door openings; 1 double-door opening; 1 coal chute; 1 icing door.

NOTE—If trim is changed in front hall, dining and living room, it will change the following items before listed: 2 mul. casement trims 9 x 12-8L; 1 triple casement trim 9 x 12-8L; 1 mul. casement trim 9 x 12-6L; 2 single casement trims 9 x 12-4L; 1 door 3 ft. x 7 ft., 1¾ round head; 1 double-door opening 4 ft. 4 in. x 6 ft. 8 in., 1¾ round head; 1 side-door trim 3 ft. x 7 ft.; 1 side-door trim 4 ft. 4 in. x 6 ft. 8 in.; 1 jamb 6 ft. x 6 ft. 8 in.; 2 side trims 6 ft. x 6 ft. 8 in.; 1 dr. 2 ft. 4 in. x 6 ft. 8 in., 1¾; 1 side trim 2 ft. 4 in. x 6 ft. 8 in.; 1 door 2 ft. 8 in. x 6 ft. 8 in., 1¾; 1 jamb 2 ft. 8 in. x 6 ft. 8 in.; 1 side trim 2 ft. 8 in. x 6 ft. 8 in.; 1 flight main stairs; 1 seat for bay; 1 mantel shelf; 1 bookcase; 152 lin. ft. base; 152 lin. ft. base moulding; 152 lin. ft. base shoe; 112 lin. ft. ceiling cove; 112 lin. ft. picture moulding; 1 astragal.



SIDE ELEVATION

FRONT ELEVATION

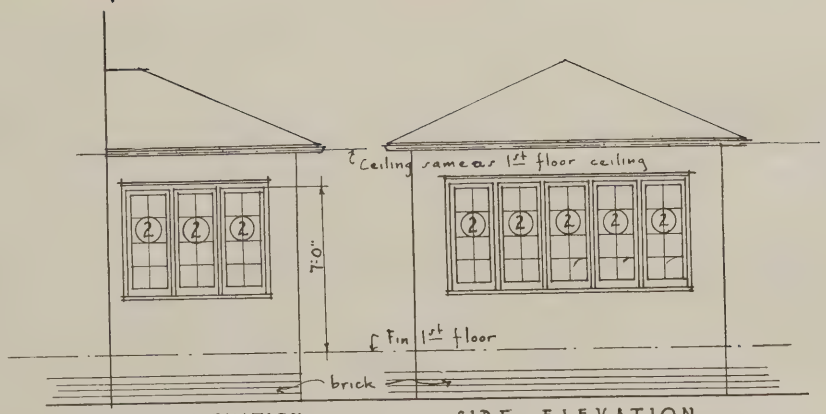
Side and front elevations of House No. 5A52, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc. Copyrighted by National Builder and The Architects' Small House Service Bureau

Dimensions are taken to outside of foundation falls, to outside of studs on exterior walls and center of studs for partitions.

Foundation walls shown concrete may be stone, brick, concrete block or load-bearing hollow tile. Where building ordinance permit, foundation walls may be 9 in. (with 20 in. x 9 in. footings) except in case of stone, which shall be 18 in. thcik.

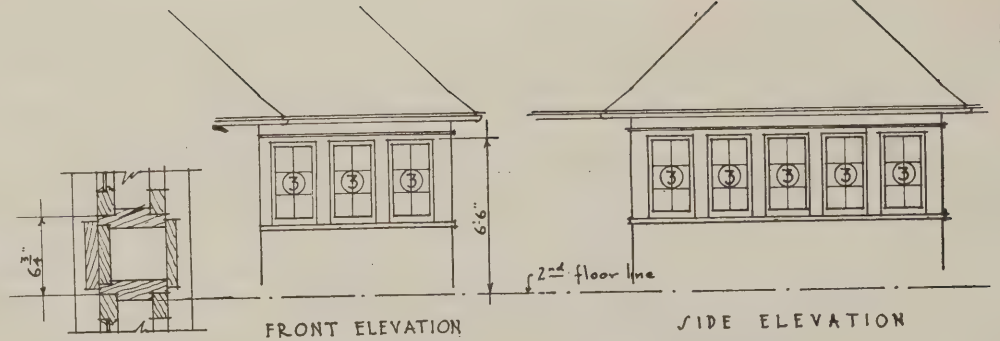
Stock numbers refer to mouldings in Universal Millwork Design Book No. 20. In case these mouldings can not be procured, others of similar design and size may be substituted.

Provide 1⅛ in. screen and storm sash for all exterior openings except ice door unless otherwise noted. Bottom rail of storm sash to have vent.



FRONT ELEVATION SIDE ELEVATION

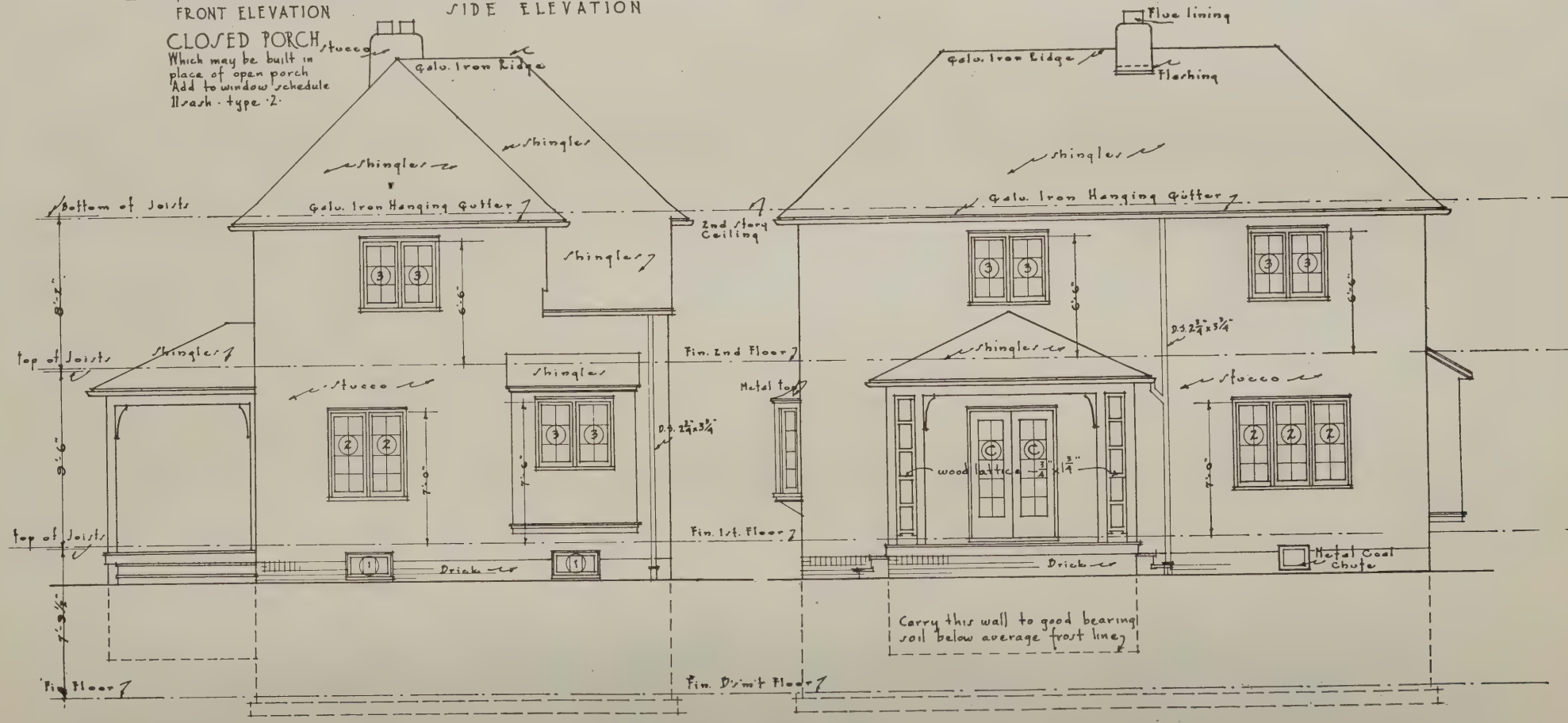
CLOSED PORCH
Which may be built in place of open porch
Add to window schedule
11 sash - type 2



FRONT ELEVATION SIDE ELEVATION

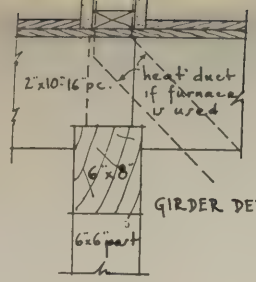
MULLION
for sleeping porch
Scale 1½" = 1'-0"

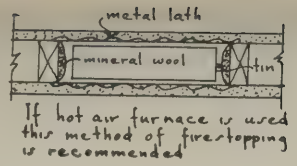
SLEEPING PORCH
Which may be built above sun porch
Add to window schedule - 9 sash - type 3
Add to door schedule - 1 door - 2'-6" x 6'-6" x 1¾" - *C113



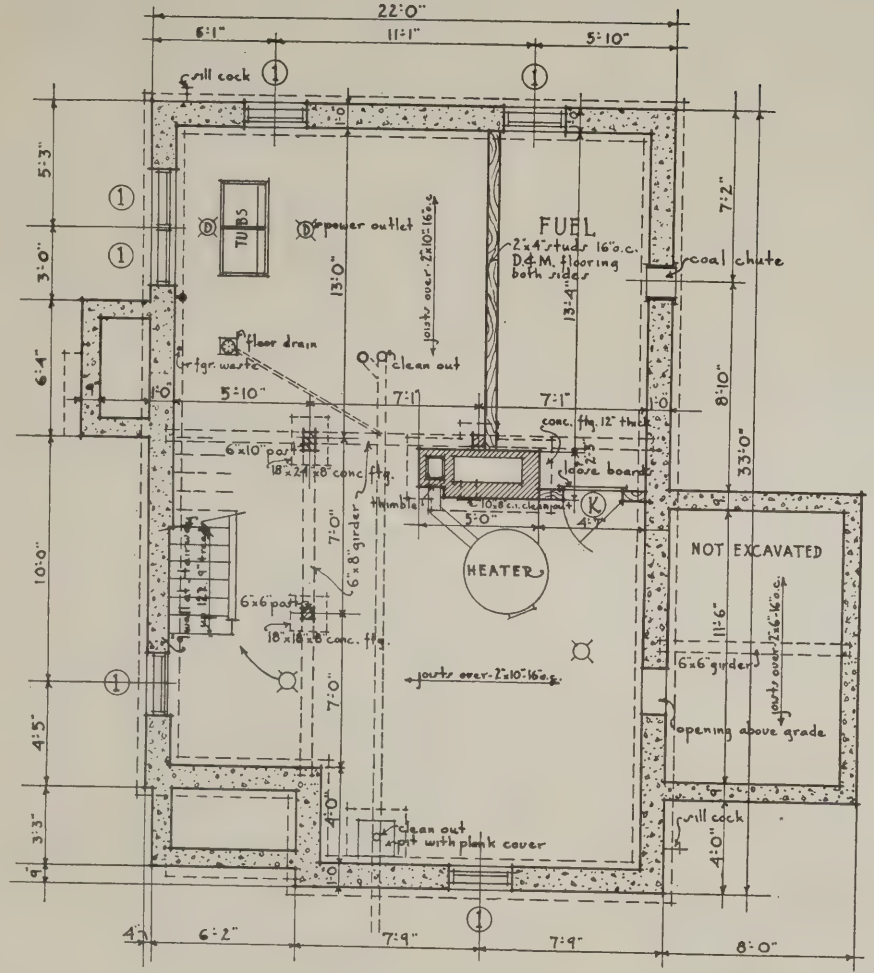
REAR ELEVATION SIDE ELEVATION

Rear and side elevations of House No. 5A52. *Copyrighted by National Builder and The Architects' Small House Service Bureau*





If hot air furnace is used this method of firestopping is recommended



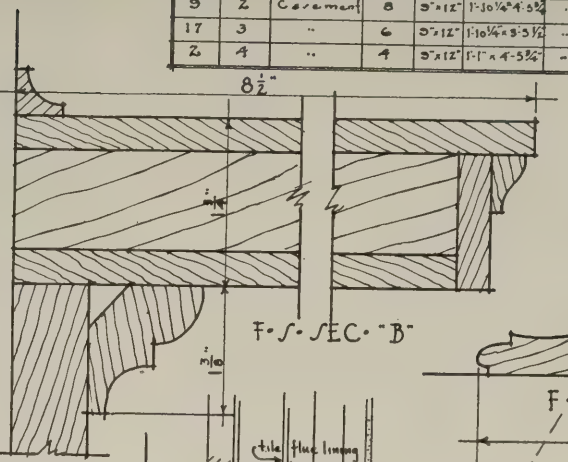
BASEMENT PLAN
Scale- 1/4" = 1'-0"

SCHEDULE OF WINDOWS

Quantity	Type	Description	No. of Lights	Size of Glass	Size of opening	Thickness
6	1	Hinged	3	8"x10"	2'-4½"x1'-3"	1⅜"
9	2	Casement	8	5"x12"	1'-10¼"x4'-5½"	"
17	3	"	6	5"x12"	1'-10¼"x3'-5½"	"
2	4	"	4	5"x12"	1'-1"x4'-5¾"	"

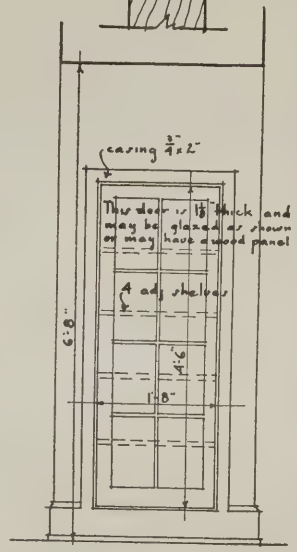
SCHEDULE OF DOORS.

Quantity	Type	Size	Description	Remarks
1	A	3'-0"x7'-0"x1¾"		Round head Ass. Elec.
1	D	2'-8"x6'-8"x1¾"	See Elec.	6 Lt. P. S/41.
2	C	Two Each 2'-6"x6'-8"x1¾"	*C-325	10 Lt. P. S/41
2	D	2'-4"x6'-8"x1¾"	*C-304	
2	E	2'-8"x6'-8"x1¾"	"	
1	F	1'-8"x6'-8"x1¾"	"	
3	G	2'-6"x6'-8"x1¾"	"	
3	H	2'-4"x6'-8"x1¾"	"	
1	J	2'-8"x6'-8"x1¾"	"	
1	K	2'-6"x6'-8"x1¾"	*C-310	

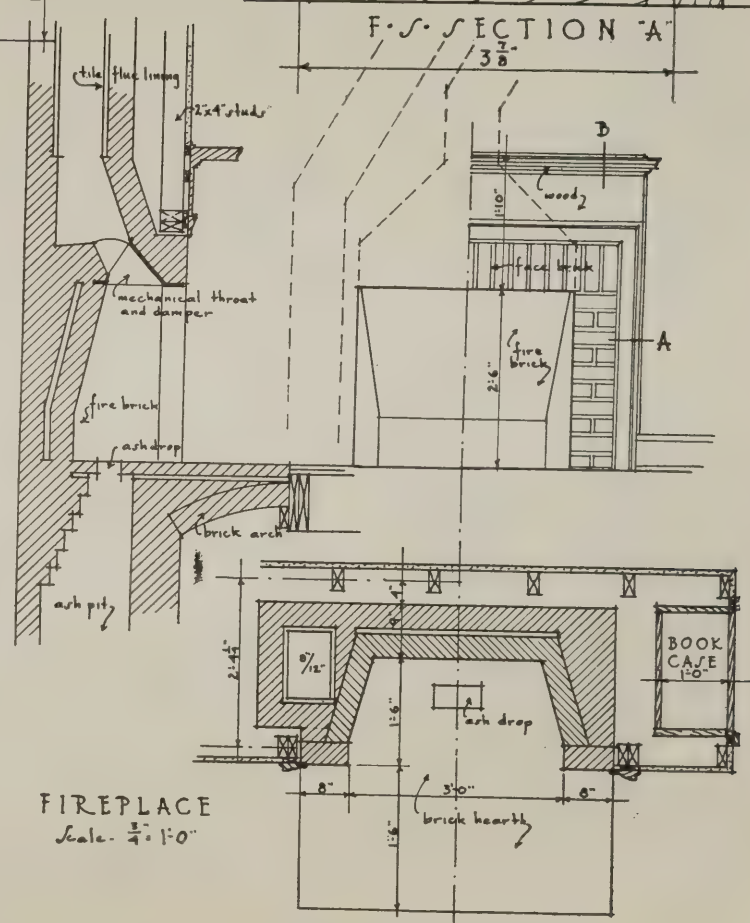


F.S. SEC. "B"

F.S. SECTION "A"
3 7/8"



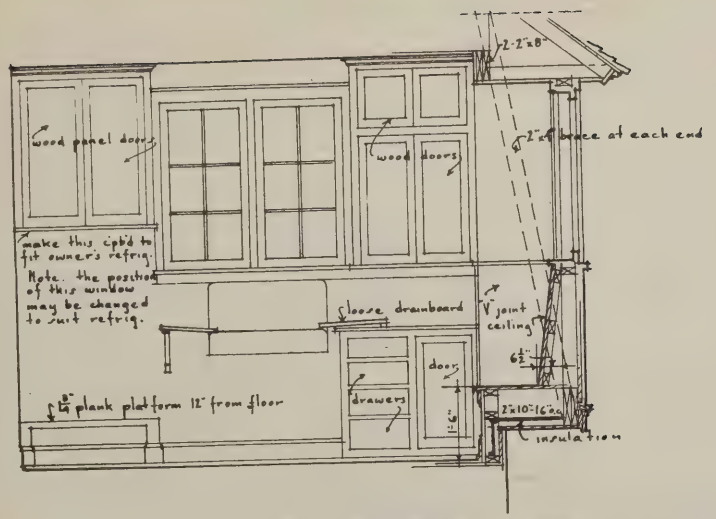
ELEVATION OF BOOKCASE

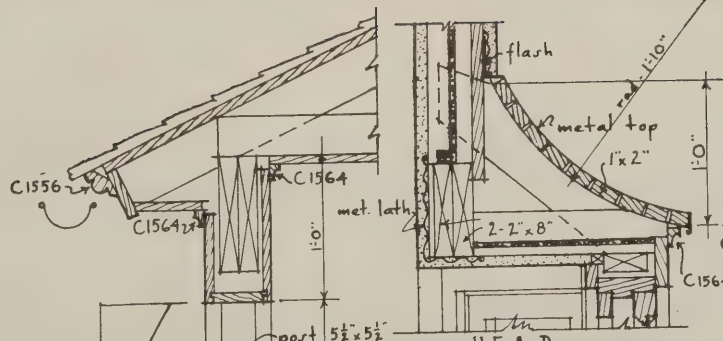


FIREPLACE
Scale- 3/4" = 1'-0"

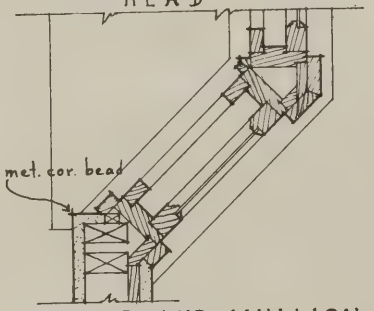
SCALE.
0 1 2 3 4 5 6 7 8

Structural details and basement plan, House No. 5A52. *Copyrighted by National Builder and The Architects' Small House Service Bureau*

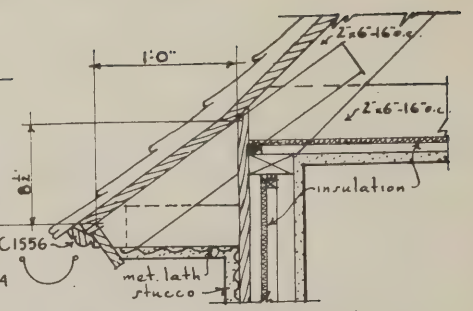




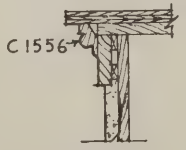
DETAIL OF PORCH



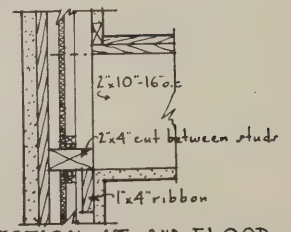
JAMB AND MULLION



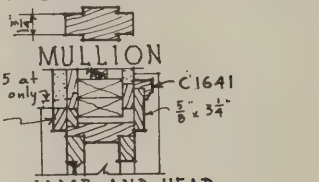
CORNICE



CORNICE ON RAKE

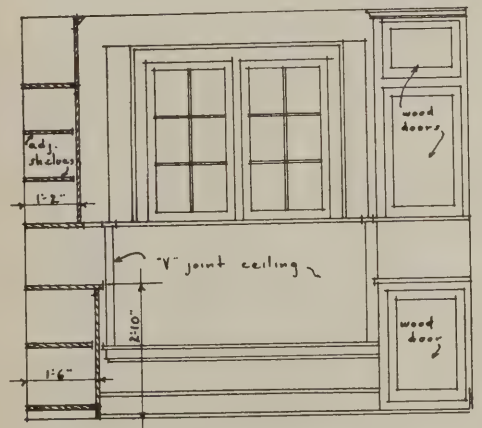


SECTION AT 2ND FLOOR

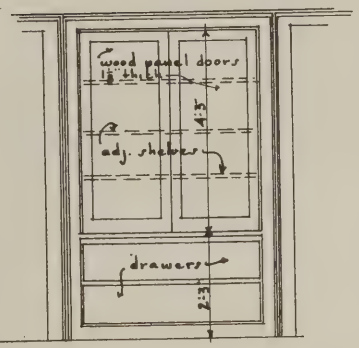


MULLION

JAMB AND HEAD

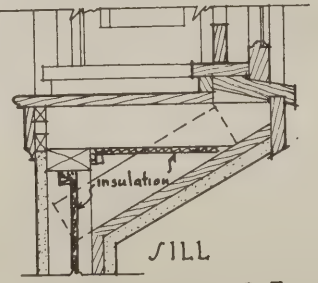


KITCHEN CUPBOARDS
Scale - ½"=1'-0"



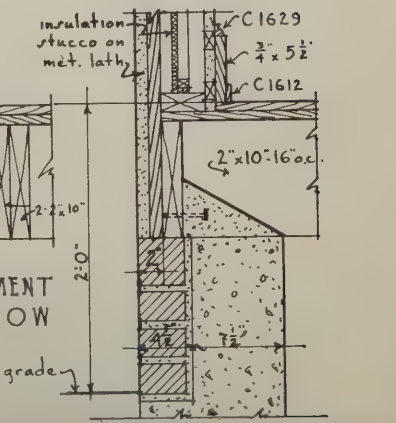
LINEN CLOSET
Scale - ½"=1'-0"

SCALE OF DETAILS
0 3 6 9 12 inches
1½"=1'-0"

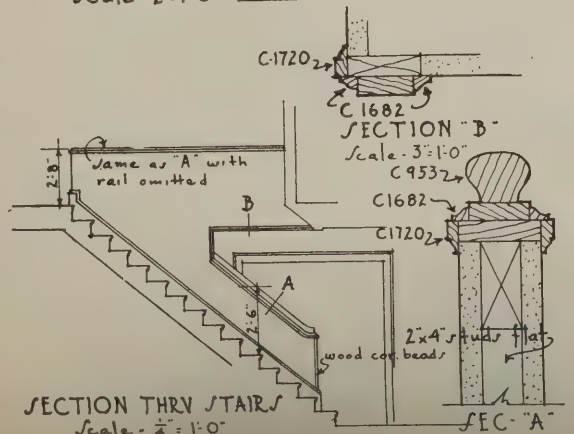


SILL

DETAIL OF BAY WINDOW



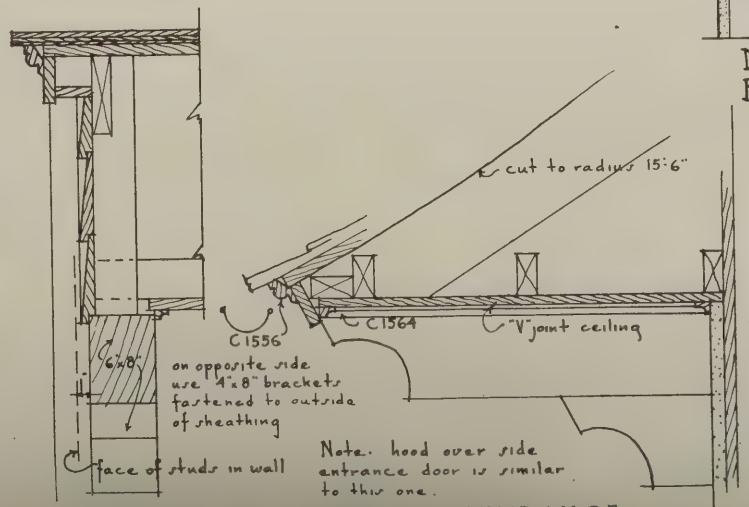
SILL



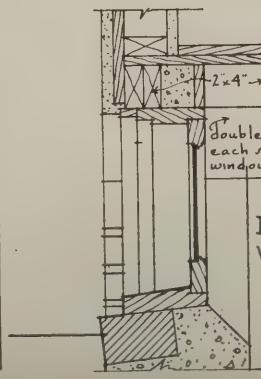
SECTION THRU STAIRS
Scale - ¼"=1'-0"

SEC. "A"

SECTION "B"
Scale - 3"=1'-0"


cut to radius 15'-6"
C1556
C1564
"V" joint ceiling
6"x8"
on opposite side use 4"x8" brackets fastened to outside of sheathing
face of studs in wall
Note: hood over side entrance door is similar to this one.

DETAIL OF HOOD AT ENTRANCE



BASEMENT WINDOW

TYPICAL DETAILS

Structural details of House No. 5A52. Copyrighted by National Builder and The Architects' Small House Service Bureau

Merchandising Houses

Making Cardboard Models for Buildings—Cardboard Models Are a Great Aid in Visualizing Blueprints

By W. F. Silliman

ONE of the main attractions at "Own Your Home" Shows is always the exhibit of house models. The average person, of course, can not read a blueprint, and about the farthest any of them can go is to get some idea of the room layout from the floor plans. So there is a good reason for exhibiting house models.

Architects, builders and contractors could undoubtedly employ many hours during off-seasons to advantage in this occupation. To help them to this end W. F. Silliman, of the Architectural House Planning Service Co., Philadelphia, Penn., who specializes in house plans and house models, has prepared the following article.

ALTHOUGH model making may be considered an art, anyone who has some knowledge of drawing can, with a little study of the subject, construct cardboard models of buildings that are in every way practical for showing the designs.

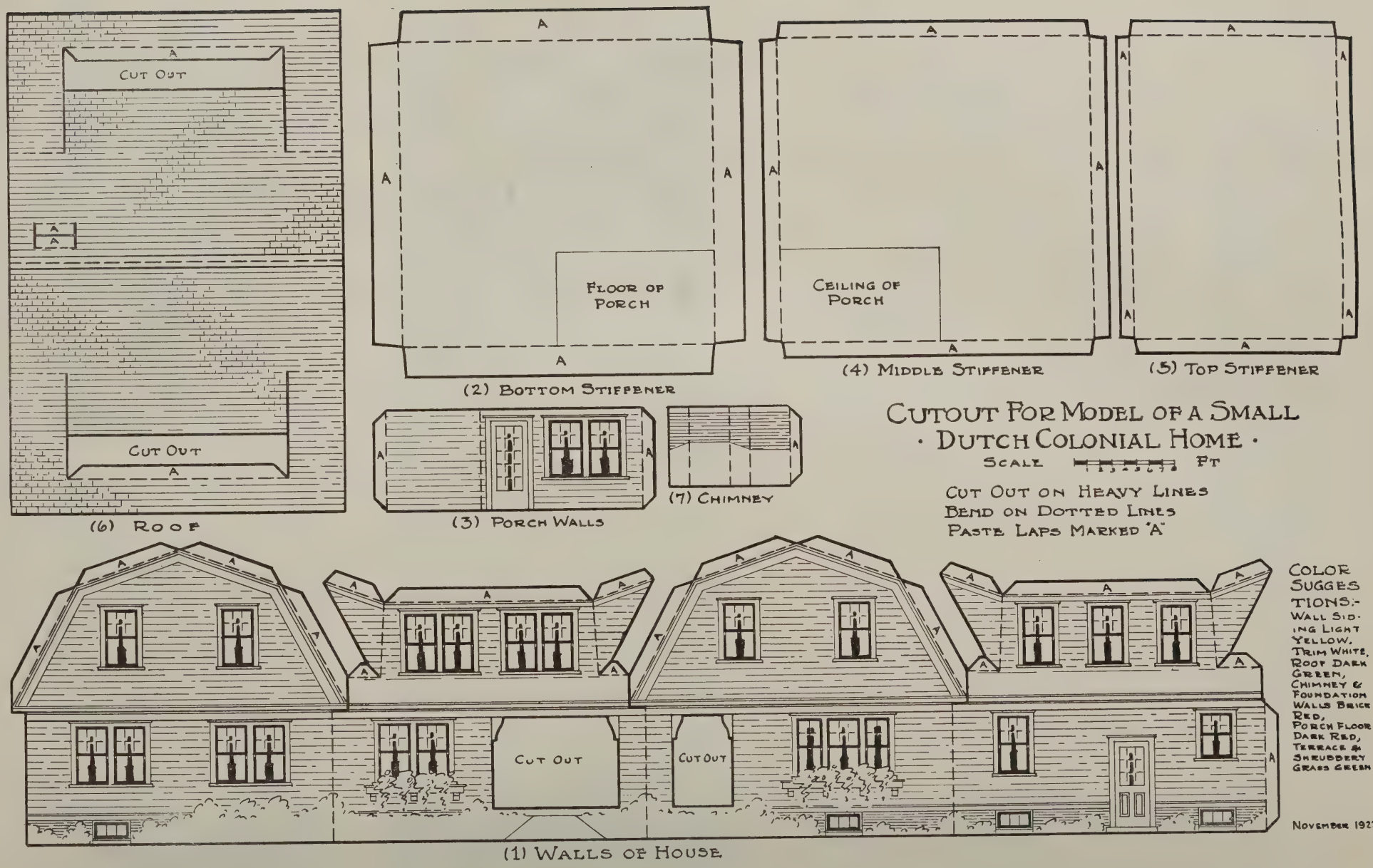
The purpose of the model is to enable persons who are unable to visualize drawings an opportunity to see in miniature what the building will look like before it is built.

It is the principle of showing the form and effect as a whole that should govern the making of cardboard models. If a person stands 400 ft. from a building he is able to observe the form and effect as one unit; whereas, if he stands closely he observes the details of the features only. With this thought in mind it is logical to proceed on the basis that features that go for making up the form of the building should be so formed, while features such as windows and doors, window boxes, trellises, trim and other detail can be drawn or painted on the surface. The carrying out of these principles is for the purpose of simplifying, as far as possible, the construction of the models and still maintaining the effect.

The material used in making models should be a thin, tough, white cardboard, with a surface that water color can be applied to. A drawing paper known as two-ply "Bristol Board" is a very satisfactory material for the purpose. The most economical and practical size to make the models is to a scale of ⅛-in. equals 1 ft. If working drawings are available they are the most satisfactory for taking off the measurements. These, however, are not necessary, as sketch drawings can be used

A "street" of cardboard model houses—for exhibition purposes

Simple models of suburban houses in natural colors are a great aid in crystallizing home-buying sentiment


CUT OUT
CUT OUT
(6) ROOF
FLOOR OF PORCH
(2) BOTTOM STIFFENER
CEILING OF PORCH
(4) MIDDLE STIFFENER
(5) TOP STIFFENER
(3) PORCH WALLS
(7) CHIMNEY
CUTOUT FOR MODEL OF A SMALL
· DUTCH COLONIAL HOME ·
SCALE FT
CUT OUT ON HEAVY LINES
BEND ON DOTTED LINES
PASTE LAPS MARKED "A"
CUT OUT
CUT OUT
(1) WALLS OF HOUSE
COLOR SUGGESTIONS:- WALL SIDING LIGHT YELLOW, TRIM WHITE, ROOF DARK GREEN, CHIMNEY & FOUNDATION WALLS BRICK RED, PORCH FLOOR DARK RED, TERRACE & SHRUBBERY GRASS GREEN
NOVEMBER 1922

Working drawings of cardboard model of Dutch colonial house

with good results.

In laying out the work it is always best to measure from an established line. That is to say: establish a floor line and make all vertical measurements from that line, and for making horizontal measurements, establish a center line for each elevation. This tends to make the work more accurate, which is an important factor in assembling. It is well to give the problem a little study before attempting to lay out the work, in order that there may be as few pieces as possible. The fewer the pieces the more satisfactory will the model be.

Practical Example

For a practical example, take the small Dutch colonial home shown in the illustration. The first step would be to draw the elevations as though the walls of the house were laid out flat with the corners fastened together, leaving one corner open. Upon these elevations would be shown the windows and doors, trim, etc., as indicated on the working drawings. The corners should be dotted lines and laps should be left for pasting where the walls come in contact with the roof and where they are to be joined. These laps should also be indicated with dotted lines. In this case it will be seen that the dormer windows are on the same plane as the walls of the house, and therefore can be made a part of the main house. With the exception of the porch walls, it can be seen from the illustration that all the walls, including the dormer windows of this house, are in one piece.

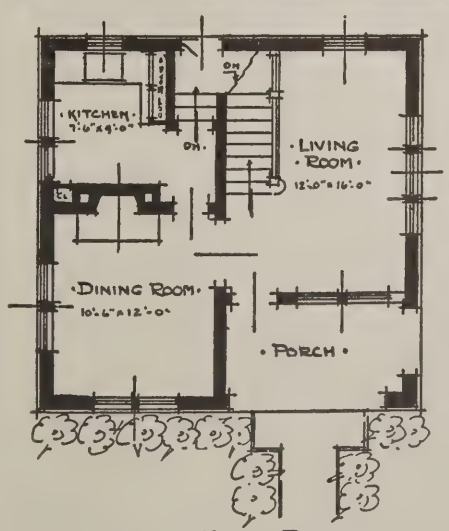
After the elevations are laid out the dimensions for all of the other parts should be taken directly from elevations in preference to the working drawings. The width of the roof would be the width of the house, while the other dimension of the roof would be the distances as measured along the rake; allowing, in addition, for projection. In the same manner, openings for the dormers and chimney should be allowed for. The bottom stiffener, which forms the shape of the house, also represents the porch floor. The measurements for this should be the exact width and depth of the house, with laps left for pasting of a width equal to the distance from the bottom of the underpinning to the top of the porch floor. The porch walls should be the length as indicated of the working drawings, and a height equal to the distance from the porch floor to the ceiling. The middle stiffener, which also represents the porch ceiling, should be the same size as the bottom stiffener with laps left for pasting. The top stiffener should be the width of the dormer windows and a depth the same as the bottom stiffener and laps left for pasting. The chimney should be laid out flat of a size as indicated on the working drawings, with a lap left for pasting together and an additional length to go through the roof. The work should first be drawn up with a pencil and then inked in with waterproof ink.

The second step is to color the drawing. This should be done before any of the work is cut out, and done with water colors in combinations suiting the individual taste.

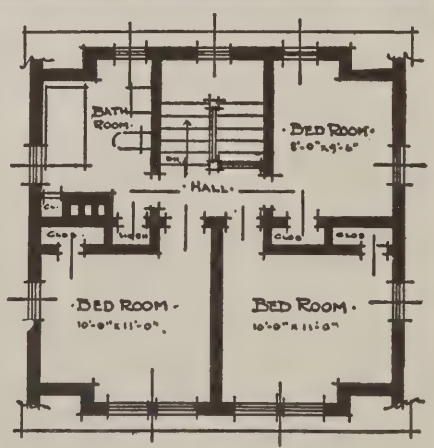
The third step is to cut the work out. Before doing this it is best to score, with the point of a knife, the dotted lines that indicate the parts to be bent. The cutting out can mostly be done with scissors, and where scissors are not practical a sharp, pointed knife can be used.

The fourth and last step is to assemble the parts. Numbers have been given to the parts in the illustration in the order in which they should be put together. The walls of the house come first and are bent at the corners as indicated by the dotted lines; the ends are then brought together and pasted. After bending down the laps, the bottom stiffener is inserted from the bottom, applying the laps well with paste before inserting. This stiffener forms the shape of the house and a portion of it represents the porch floor. The porch walls are then bent to form and pasted in to place. The middle stiffener is inserted from the top and pushed down into it rests on top of the porch walls, thus forming the porch ceiling as well as stiffening the model. The top stiffener is inserted near the top of the dormer windows and the sides of the dormers are bent around and pasted to the laps. The roof is then put on and is held in place by pasting it to the laps left on the elevations to receive it. The chimney is the last part and this is inserted through the roof and held in place by pasting it to the laps left by making the opening.

The above directions are dealing with the Dutch colonial house shown in the illustration. Different designs present different problems, but generally speaking the principle remains the same. This illustration of the cutout may be pasted to a thin piece of cardboard and assembled if desired.



FIRST FLOOR PLAN



SECOND FLOOR PLAN

Cardboard model and floor plan of house described in this article

The Situation—Boundless Optimism

EVERY week since January 1 seems to have added to the prospects of a record-breaking building program in 1923. January building statistics — permits issued in the largest cities — showed a gain of 45 per cent over 1922; and 1922 was a record year. Even during the severe winter weather of February, construction has kept up at a record-breaking pace. And this building activity seems to be general, from the Atlantic to the Pacific states.

Not only is the building industry unusually active and prosperous but the trend of all business is very satisfactory. A statement by the National City Bank, of New York, says: "There is no slackening of industry and all domestic conditions give promise of a good year. Industry is about as active as it was ever known to be or can be with the present labor supply. The steel industry has its capacity pretty well sold up to the middle of the year, which is significant as to the outlook in various lines of construction. The railroads are taking a great deal of steel, likewise builders and automobile and implement manufacturers. House building is headed toward another big year and office-building construction now promises to go ahead of last year. Manufacturers of cement, plaster, lumber and all building materials are looking for a record year."

A thorough-going survey of the work and projects in architects' offices by the *Architectural Forum*, shows a volume of building in prospect considerably exceeding that in 1922. The accompanying table is a summary of these data. As a large volume of dwelling house construction does not go through architects' offices at all, the prediction that about 20 per cent of all construction will be residential is probably conservative.

The demand for houses seems to be insatiable in most cities. For example in Los Angeles, Calif., where house building has been going on for two years at a record-breaking pace, a recent news item states: "That Los Angeles is not yet catching up with its house requirements is made evident by the official report of building permits issued during 1922. During the year there were issued permits for apartments, dwellings and flats to accomodate 28,033 families. This, it is believed, will almost care for the new population that has come here during the year and will in no way overcome the shortage that existed at the beginning of 1922.

"However, it is noticeable that with the latter part of the year the permits for homes increased in number. The momentum thus gained, it would seem, would carry on into 1923 an even greater home building campaign in this city. In January of last year permits were issued that would house 1675 families. In October these permits reached a total of 3080; in November they were 3052, while in December they totaled 2402. The slump for December is accounted for by the fact that the holiday season has a tendency to slow down building activities."

In other words, in one of the most booming of cities the boom bids fair to continue for another year at least. And the same holds true in other cities and towns which have not yet enjoyed a full-fledged building boom.

Rising Prices and Wages

The result of all this activity and the very widespread publicity it has been given is an inevitable tendency of prices and wages to rise. The only wonder is that they do not rise more. Fortunately, however, there seems to be a very general tendency on the part of both building-material producers and union labor to be reasonable and not to take immediately all possible advantage of the tremendous potential demand for construction.

Lumber trade papers are full of such items as these: "Salt Lake City, Utah.—Local wholesale lumbermen did a third more business in January than they did the same month a year ago. It is generally conceded that 1923 will prove a banner year for the construction industry. Prices of lumber are advancing, the increase on common lumber to dealers being about $3 on the average, or 10 per cent." "Portland, Ore.—The demand for the lumber products of this section is decidedly active and increasing. Mills have orders as far ahead as they deem advisable. Prices are gradually stiffening." "Alexandria, La.—Orders seem to be more plentiful

BUILDING TYPES	N. EASTERN STATES	N. ATLANTIC STATES	S. EASTERN STATES	S. WESTERN STATES	MIDDLE STATES	WESTERN STATES	U S. A.
Dwellings (Under 20,000)	$16,622,000	$86,465,000	$12,825,000	$12,084,000	$59,160,000	$34,925,000	$222,081,000
" ($20,000 to $50,000)	11,668,000	41,828,000	8,587,000	10,552,000	33,468,000	12,757,000	118,860,000
" (Over 50,000)	6,045,000	27,481,000	2,031,000	6,113,000	21,077,000	10,444,000	73,191,000
Apartments	56,020,000	237,296,000	25,392,000	34,323,000	229,552,000	80,302,000	662,885,000
Hotels	33,589,000	141,146,000	27,683,000	40,765,000	205,332,000	60,475,000	508,989,000
Clubs, Fraternal, etc.	15,888,000	58,221,000	13,268,000	28,784,000	109,700,000	50,406,000	276,266,000
Churches	17,577,000	128,120,000	15,128,000	25,519,000	82,903,000	43,688,000	312,936,000
Community, Memorial	14,620,000	27,401,000	1,950,000	6,209,000	46,509,000	21,099,000	117,788,000
Welfare, Y.M.C.A., etc.	3,295,000	15,702,000	2,576,000	3,302,000	15,680,000	9,688,000	50,242,000
Hospitals	13,594,000	54,166,000	6,972,000	27,438,000	105,096,000	52,148,000	259,414,000
Office Bldgs.	21,157,000	88,877,000	18,089,000	26,359,000	190,486,000	82,603,000	427,570,000
Banks	17,608,000	54,328,000	8,835,000	18,783,000	154,482,000	38,669,000	292,705,000
Schools, Public Bldgs.	65,159,000	158,165,000	41,515,000	31,930,000	383,036,000	190,228,000	870,034,000
Theatres	9,573,000	34,847,000	2,759,000	7,381,000	29,388,000	17,943,000	101,891,000
Stores	11,113,000	35,383,000	6,826,000	7,480,000	58,361,000	27,723,000	146,887,000
Industrial	29,859,000	162,762,000	38,824,000	25,231,000	241,871,000	49,488,000	548,037,000
Automotive	11,988,000	35,942 000	2,799,000	8,386,000	52,464,000	15,190,000	126,768,000
Total Value of New Buildings	$355,375,000	$1,388,130,000	$236,059,000	$320,639,000	$2,018,565,000	$797,776,000	$5,116,544,000

than ever. Prices on many items are advancing. Stocks at the mills are becoming depleted. Orders exceed production and shipments. Orders are now being placed for shipment within 60 days." "Kansas City, Mo. —Last week has been marked by a stronger demand from the smaller retailers, especially the country yards. In general prices are getting stronger, and with stocks steadily dwindling to the vanishing point, further advances are a certainty."

During the latter part of February heavy storms on the West Coast and floods in the South have had a further effect in limiting production and a falling behind in orders.

While some commodities like portland cement, in many cases evidence seasonal declines, these are largely inducements offered to dealers and contractors to stock up early, and are certainly of a temporary character. The prices of steel and steel products are advancing. Nevertheless prices are more stable than they were a year ago. There was a gradual but steady increase as the season advanced. Average prices in January, 1923, as compared with average prices in January, 1922, according to Tomkins Brothers, Newark, N. J., were as follows:

Average Price Changes from January, 1922, to January, 1923

Portland Cement	25	per cent increase
Sewer Pipe	30	" "
Flue Lining	40	" "
Hollow Tile	25 to 40	" "
Face Brick	6	" "
No. 1 Fire Brick	31	" "
No. 2 Fire Brick	28	" "
Common Brick	11	" "
Metal Lath	2½	" "
Wall Plaster	0	" "
Finishing Hydrate	9½	" "
Masons' Hydrate	10½	" "
Lump Lime—Bulk	0	" "
Lump Lime—Barrels	6	" decrease.
Calcined Plaster	3½	" "

Wages of building trades labor show increases of about 10 per cent in many new agreements being made this year. Such increases are being quite generally granted by employers without controversies. Undoubtedly the reason for this acquiesence is the fact that in nearly all the big cities last year employers formed the habit of paying bonuses and wages considerably above the prevailing scale, so that these paper increases are not so real as would appear. One fact does stand out and that is the men appear to be giving a day's work for a day's pay much more cheerfully than they did during the flush times of war days.

Typical conditions in the Northwest where the opening of the construction season is still two months off are illustrated by a wage scale drawn up by the Minneapolis Building Employers Association at the third annual convention held at St. Paul, February 2. The wages of skilled labor will be advanced in 14 Minnesota cities an average of 10 per cent June 1. The wage scale as adopted, as compared with the scale of 1922, is:

	1923	1922
Bricklayers	$1.12½	$1.00
Carpenters	.87½	.80
Cement finishers	.87½	.80
Electricians	.87½	.80
Hoisting engineers	.87½	.80
Structural iron workers	.87½	.80
Ornamental iron workers	.87½	.80
Wood lathers	.87½	.80
Painters	.87½	.80
Plasterers	1.12½	1.00
Plumbers	.87½	.80
Steam fitters	.87½	.80
Sheet metal workers	.87½	.80
Stone setters	1.10	1.00
Stone masons	.87½	.80
Team and teamsters	1.05	.95
Roofers	.82½	.75
Mason tenders	.71½	.65
Skilled building laborers	.55	.50

Builders' reports show that the labor shortage is not general, and applies only to particular trades and localities. Bricklayers, plasterers and carpenters are still in demand in a number of the larger cities, as well as some common labor. Many cities, however, such as Boston, Cincinnati, Detroit, Pittsburgh, Philadelphia and Des Moines, Iowa, report an ample labor supply and in some trades a surplus of help.

Current Prices of Materials

Ruling retail prices in Chicago on February 15 were as follows:

Dimension lumber, per M	$48.00 to $52.00
Boards, per M	53.00 to 70.00
Shingles	4.00 to 6.50
Lath	9.50 to 14.00
Pine flooring	80.00
	Per bbl.
Portland cement	$3.00
Bulk lime, Wis.	1.35@ 1.40

	Per Yard
Lake and bank sand	$2.75
Torpedo sand	3.00
Crushed stone, gravel screenings	3.00
Smooth, buff	45.00@48.00
Common brick	12.00
Smooth, Ohio red	40.00@42.00
Smooth, Pennsylvania red	45.00@48.00
Smooth, Silica Slag, gray	23.00@25.00
Smooth, gray	48.00@50.00
	Per Ton
Hydrated lime, Ohio paper	$18.00
Hydrated lime, Wis. paper	16.50
Neat plaster	16.00
Prepared plaster	14.00
Wood fiber	16.50
Tile—	Per Foot
3-inch gypsum tile	.11
4-inch gypsum tile	.13
Partition Tile—	
3-in. clay, per M feet	$82.50
4-in. clay, per M feet	88.00
6-in. clay, per M feet	121.00
8-in. clay, per M feet	165.00
Flue Lining—	Per Foot
4x8 inch	.18
8x8	.24
8x12	.36
12x12	.46
18x18	.90
Coping—D. S.—	
9-inch	.16
12-inch	.24
18-inch	.52
Sewer Pipe—	
3 & 4-inch	.15
5 & 6-inch	.22½
8-inch	.35
9 & 10-inch	.52½
12-inch	.67½
Face Brick—	
Standard, vitrified red	32.00@34.00
Smooth, Indiana red	30.00@32.00

The average retail prices being paid for building material in the East as of February 15 are as follows:

Dimension lumber	per M	$ 55.00 to	$ 72.00
Boards	per M	58.00 to	70.00
Oak flooring, ⅜-in.	per M	125.00 to	135.00
Clapboards and siding	per M	125.00 to	150.00
Shingles		6.50 to	9.50
Lath		11.00 to	12.00
Pine flooring		140.00 to	180.00
Portland cement	in truck loads, per bbl.		3.60
Portland cement	in less than truck loads, per bbl.		3.80
Lime, common	180 lbs., net, per bbl.		3.00
Lime, common	280 lbs., net, per bbl.		4.00
Lime, finishing	180 lbs., net, per bbl.		3.25
Lime, finishing	280 lbs., net, per bbl.		4.35
Lime hydrate, common	in paper, per ton		20.00
Lime hydrate, Ohio, finishing	in paper, per ton		23.00
Sewer pipe (standard)	discount off list		40%
Sewer pipe (double strength)	discount off list		25%
Flue lining	discount off list		40%
Wall coping	discount off list		35%
Fire brick, boiler No. 1	per M		70.00
Fire brick, high grade	per M		80.00
Fire clay	per ton		30.00
Brick, New York, (kiln run)	per M		22.00
Brick, Tuttle, kiln run	per M		25.00
Brick, water struck	per M		40.00
Brick, ruff texture	per M		50.00
Plaster, Calcined	250 lbs., per bbl.		4.65
Plaster, Calcined	320 lbs., per bbl.		6.65
Plaster, calcined (finishing)	250 lbs., per bbl.		4.80
Plaster, calcined (finishing)	320 lbs., per bbl.		6.80
Plaster sanded mortar	in 15c. bags, per ton		19.00
Plaster fibre mortar	in 15c. bags, per ton		22.00
Plaster boards	each, 32x36		.25
Metal lath, Bostwick	each, 4.5 lbs. per 100 sq. yds.		32.00
Metal lath No. 24G expanded	2.4 lbs. per 100 sq. yds.		27.00
Metal lath No. 26G expanded	2.8 lbs. per 100 sq. yds.		24.00
Metal lath No. 27G expanded	2.4 lbs. per 100 sq. yds.		21.00
Wood lath, spruce, 1⅝-in.	per M		12.00
Corner bead, galvanized	per ft.		.04
Partition blocks	terra cotta, 4x12 each		.18
Partition blocks	terra cotta, 8x12 each		.30
Partition blocks	gypsum, 3-in., per sq. ft.		.15
Partition blocks	gypsum, 4-in., per sq. ft.		.17
Hair, No. 1, cattle	per bushel		.50
Crushed stone, truckloads	per ton		2.50
Mortar sand, truckloads	per ton		1.75
Beach sand	per ton		5.00
Asphalt shingles, individual	8x12½, per sq.		7.25
Asphalt shingles, strip	10x32½, per sq.		6.75
Roll roofing, slate surfaced	80 lbs., per roll		3.00
Roll roofing, talc surface	40 lbs., per roll		2.00
Roll roofing, talc surface	50 lbs., per roll		2.35
Roll roofing, talc surface	60 lbs., per roll		2.75
Building paper	black waterproof, 45 lbs. per roll		2.75
Mortar color, red	per 100 lbs.		3.00

Fire Tests of House Construction

Fire Retardant Value of Metal Lath and Plaster Partitions on Wood Joists and Studs

IT HAS been said that 17,000 lives are lost each year through fires quickly obtaining a foothold in buildings of the usual type of construction. Undoubtedly a great many of these lives could have been saved had proper precautions been taken to prevent the spread of fire. Experiments have established the fact that no present form of construction is "fire-proof," and that no construction material can withstand constant exposure to heat and flame without undergoing some change. Inasmuch as it is physically impossible to make a building fire-proof, the problem then is how to make it "fire-resistant," that is, how to build it so that it will stand the destructive action of fire as long as possible.

With this end in view, the Associated Metal Lath Manufacturers and the National Lumber Manufacturers' Association, acting jointly, arranged for a series of tests at the Underwriters' Laboratories in Chicago to determine the fire-retarding value of certain types of building construction. The tests were made in accordance with the Standard Specifications for Fire Tests of Building Materials and Construction, of the American Engineering Standards Committee, and the results presented in this article are taken from a report just issued by the Chicago Underwriters' Laboratories.

Conclusions based upon the results of the tests are given in the report as follows: "A wood joist floor construction utilizing a metal lath and gypsum plaster ceiling finish, when exposed on the ceiling side to standard fire-test conditions, will for at least one hour safely sustain its rated load and suffer no serious reduction of strength or of cross-section area of combustible load bearing units and will prevent the passage of fire through the assembly for at least one hour unless previously subjected on the ceiling side to the impact and eroding effects of standard hose streams. Upon application of hose streams after a thirty-minute standard fire-test exposure, the gypsum plaster finish will be destroyed.

"The fact that the combustible units of the construction will be burning within the one-hour period (about 45 minutes) should have consideration, but does not detract from the performance of the assembly as a fire retardant up to the limiting period."

Typical partition sections, plastered on one side and tested in the same manner as the ceiling-test specimen gave rise to the following conclusions: "A single finish, metal lath on wood supports and with a three-coat gypsum plaster coating when exposed on the finish side to standard fire-test conditions, will delay active combustion of its wooden supports for about 45 minutes, after which period it will continue to prevent the passage of flame through the finish up to at least one hour's total fire exposure. Upon application of a standard fire hose stream, during or immediately following fire exposure, the fire-retarding properties of such a single finish will be almost entirely destroyed after 30 minutes of such fire exposure."

The tests were made in specially constructed furnaces and the test specimens were actual, built-up sections of walls and ceilings. They were built by regular mechanics, working under actual construction conditions. Lath of the expanded metal type with ⅜-in. diamond mesh pattern was used, and the plastering consisted of three coats which together made up a thickness of about ¾ in. The scratch coat was composed of one part by volume of gypsum plaster and one part by volume of clean, sharp, dry sand. The brown coat was made of one part by volume of gypsum plaster and two parts by volume of clean, sharp sand, and the finish coat was composed of three parts by volume of lime putty and one part by volume of dry calcined gypsum plaster, finished smooth and true. The test specimens were allowed to remain in position for 30 days after the application of the plaster finish in order that the plaster would have an opportunity to set and harden.

During the test, the plastered side of the ceiling-test specimen was subjected for 75 minutes to strong jets of flame which impinged directly on the ceiling surfaces and

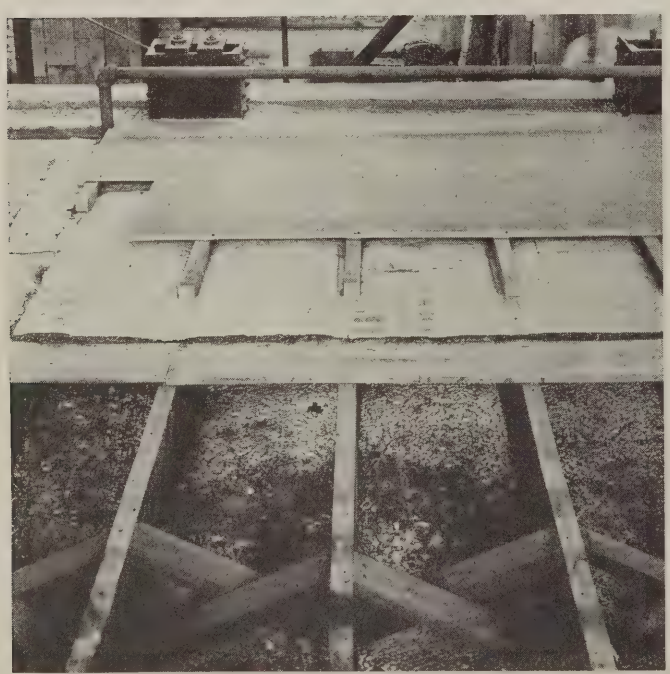


Fig. 1—Section of test specimen showing construction

Fig. 2—Condition of plaster ceiling at end of test

the average temperatures ranged from 1300 degrees ten minutes after the test was started to about 1780 degrees at the end of the test. At the end of the 75 minutes, the fire was shut off and the spaces between joists sprayed with water. Fig. 1 shows the condition of the various parts of the structure after the test, as seen from the top, and Fig. 3 shows a section of a joist, illustrating the degrees to which it was charred by the heat. In Fig. 2 is shown the condition of the plaster ceiling at the end of the test.

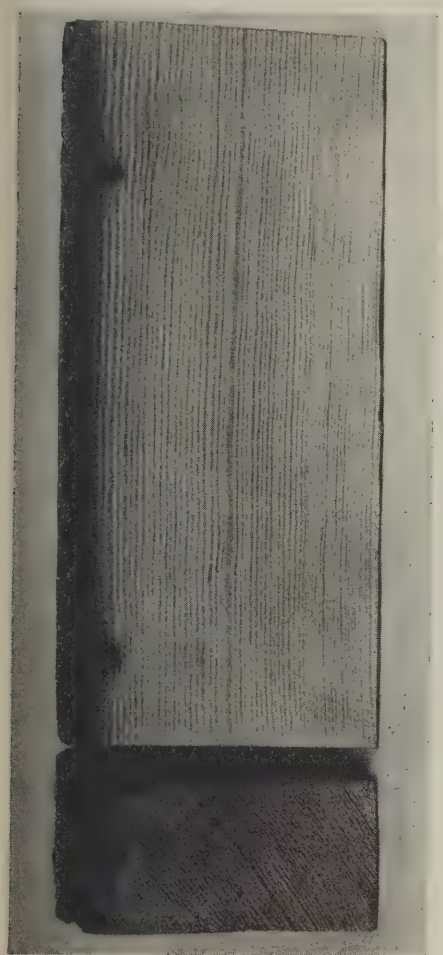


Fig. 3—Typical joist, showing degree of charring due to heat on under side

The plaster fell from position after the furnace fire was shut off and water had been sprayed into the joist spaces above the metal-lath and plaster ceiling.

It would appear that these results are highly gratifying. Any type of construction that will prevent the spread of fire is worthy of consideration, especially if it requires no more elaborate equipment for installation than is generally used.

In connection with these tests on metal lath and plaster, it might be interesting to compare the results with others of a similar nature where wood lath was used instead of expanded metal. A special information card from the Underwriters' Laboratories, carries the following notation: "Tests of wood lath and two-coat lime-plaster finish on wood studding, the assembly representing average quality of materials and average workmanship, indicate that this finish, when subjected to standard fire exposure, will serve as a barrier to passage of fire into the stud channels for about four minutes." Since the conditions of the test on wood lath were not the same in all respects as those on the metal lath, these figures do not afford an exact comparison but they do seem to indicate that as far as fire-resistance is concerned, metal lath construction is far superior to wood lath.

Right Way to Do a Good Stucco Job

By O. A. MALONE, Atlas Mortar Company, San Francisco

IT has been said, and no doubt with truth, that proper workmanship is over 50 per cent of good stucco.

A frame building should be thoroughly covered with a good roofing felt, starting at the bottom and lapping at least two inches as you go to the top. On this should be applied a metal reinforcement (any good open-mesh metal lath or chicken wire), which should be furred out at least ⅜ in. from the roofing felt, and in every instance all joints should be well lapped and tied together, thus creating a continuous reinforcement over the whole surface to be plastered. Then a mortar composed of one part of cement, to which has been added 10 per cent of hydrated lime and three parts of clean, sharp sand, should be shoved thoroughly through the reinforcement, so as to form solidly against the roofing felt. Scratch this coat and let dry two weeks, if possible. Then a second coat of the same mortar as specified for the first coat should be put on to a thickness of at least ½ in. over the face of the first coat. If the weather is dry and hot, this coat should be wet down for at least three days, then allowed to become dry before finishing coat is applied.

We now have at least 1 in. of mortar from face of roofing felt, with reinforcement in center of the slab where it should be. Nothing can destroy a wall built in this manner without first destroying the frame upon which it is constructed.

We have been manufacturing California stucco since 1915, and after closely observing it over that period of time, and seeing it used on all the prominent plastered buildings in California and elsewhere, we believe that it is the best possible finishing coat to apply. It comes in practically any color, and any texture may be made from it, thus eliminating the extra cost of painting, which at best is not permanent. We would warn you that, like all other good proven products, California stucco is being imitated.

We want to say to those who might object to the slight variation in color obtained in the use of colored stuccos, that the most prominent and greatest artists and architects will not tolerate a one-tone wall, because it lacks interest and the substantial appearance of a wall that must be exposed to the elements.

The so-called waterproofing need not be given any worry, for a wall constructed as described above is mechanically waterproofed, the only way that it can be permanently and successfully done.

Plastering on masonry is not, in our estimation, nearly so important as the plastering on a frame building, inasmuch as a masonry wall forms a nearly perfect base to plaster on.

It should be stated in conclusion that the above description of a good plastering job is in full accordance with the findings of the Bureau of Standards' investigation of stucco.

House properly prepared for a good stucco job

Questions, Answers, Kinks and Discussions

Edited by V. L. Sherman

Herein is a Department of Mutual Help for the Exchange of Experiences and Ideas. It is Not Only Well Worth Your While to Give Your Experiences for What You Get Back from Others, but National Builder Pays You $5 Each for Every Good Kink

Avoiding End Grain

NEAT work in the art of joinery is always something to aim for. The sketches submitted by C. C. S., of Moline, Ill., in Fig. 1, show the possibilities of bevels.

"In building china closets, medicine cabinets, etc., I have always objected to end

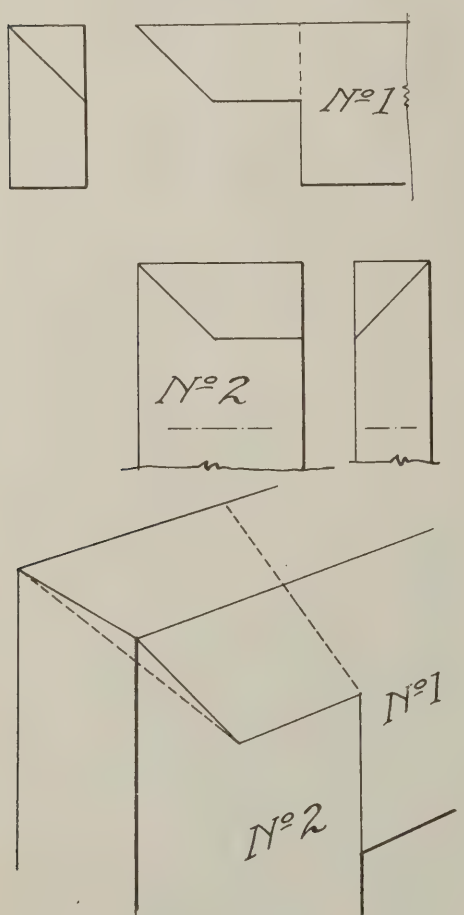


Fig. 1—Avoiding end grain in joinery

grain showing at end of head casing. In good work have cut a return quite often, but think the enclosed sketch gives much the best appearance. Of course, this is not for hurry-up work."

A Sash Cord Kink

B. W. C., of Everett, Mass., writes: "I am sending a sketch, Fig. 2, of the way I hang windows in a frame building. When the building is being plastered a small opening, about 2 in. x 8 in., is left just below the pulleys on each side of the frame. After the sash is fitted, take the loose end of the sash cord, push it over the pulley of the inner sash, and pull it out through the opening left in the plastered wall. After pulling out about 15 or 20 ft., according to the size of the window, put the cord over the pulley on the other side and through the hole as before. Weave it across the other two pulleys in the same way so that the loose end comes out through the hole in the plaster last. Now tie the weight on this loose end, put the weight inside the hole. Pull down on the cord until the weight strikes the pulley and cut the cord four inches longer than the hole in the sash. That is, measure from the hole in the sash to the bottom of the sash, then take the number of inches from the sill of the frame up, deduct four inches, and that will give the correct length of cord. Loop the cord so that it will not escape through pulley and proceed with next weight.

"I find this quicker than cutting the cords the desired length and using a mouse. Also it eliminates all waste."

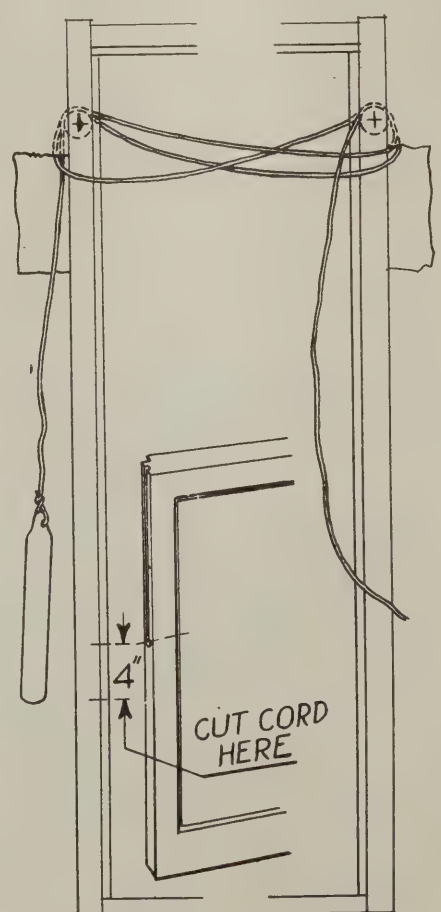
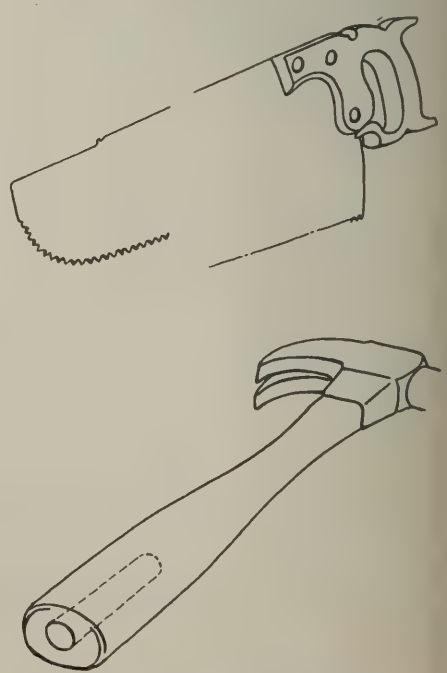


Fig. 2—A sash cord kink

Two Handy Tools

THE two ideas, shown in Figs. 3 and 4, were submitted by W. M C., of Tulsa, Oklahoma. Of the first he writes: "Round the point of any saw for about one inch



Figs 3 and 4—Two handy tools

back from the end. If you happen to have no key-hole saw with you this will be found very handy. You can cut through a solid wall without having a hole to start with. This does not interfere with the regular use of the saw.

"The second kink is to bore a 3/8-in. hole in the end of your hammer handle, about 2 in. deep, and fill it with melted parafine wax. When you have oak or any hard wood to nail simply stick the end of the nail in the parafine and it will drive without bending. This way you always have the parafine with you."

Basement Windows in Houses of English Type

THE editor wishes to submit the photograph shown in Fig. 5, in answer to a query concerning the use of basement windows in houses of English type where the grade comes pretty well up. The house shown is a very attractive one, drawn by the owner, an architect, and built about ten years ago.

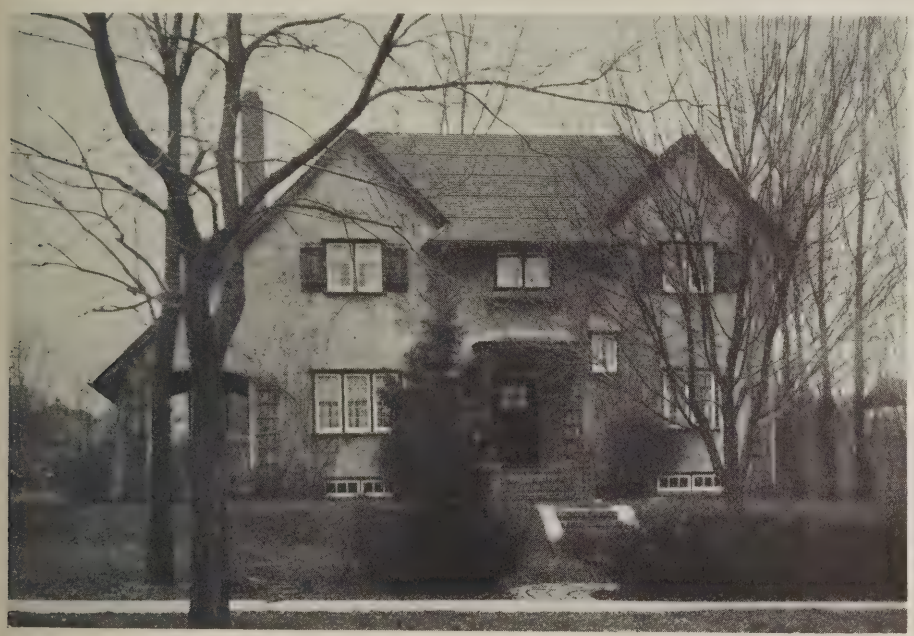


Fig. 5—Basement windows in houses of English type

Suggestions in Hollow Tile Building

B. F. C., of Hutchinson, Kan., submits the following methods in connection with building in hollow tile. He writes: "In hollow-tile work the writer has done away with the use of wedges driven into mortar joints to nail wooden fixtures to, and has adopted a method which gives 100 per cent satisfaction and which, he believes, will be of interest to others.

"A good way to make blocks for nailing to is as follows: Make the blocks the same width as the hollow in the end of the tile and about one inch longer, then saw a tenon in each end of the block, leaving it about three-quarters of an inch thick at each end (see Fig. 6). When laying tile place a block in the end of every other one, if you wish to have them 2 ft. apart, or in every one, if you wish to have them 1 ft. apart.

"Before the walls are plastered one should make a sketch of each room showing how far it is from one corner to the first block, and how far to the ceiling, and how far to the floor. That is all that is necessary to put on the sketch as the blocks will be found to be one foot apart or two feet, as the case may be.

"Some builders fasten the roof on a tile wall by running a bolt through two or three courses of tile and the wall plate. As a rule, all that is necessary to fasten a roof on a dwelling house is to run the partition plates over the wall plates, and spike them well. But, of course, this cannot be done on a garage or other like structures. A good way is to twist two No. 9 wires together, run them under the floor joists and over the ceiling joists, or better still, clear over the rafters. Then unite the ends and with the aid of a bolt or small iron twist the wires together until they are perfectly tight. If the walls are to be plastered these wires can be drawn tight up to the wall by running spikes between them and driving them into the mortar joints. Then the wires can be covered with plaster (see Fig. 7).

"All window and door frames in a tile building should have double jambs. The sub-jambs for a door frame should be made of 1 in. x 6 in. and must be sized to the same width as the main jamb so it will form a ground for the plaster, and a piece to nail the inside and outside casings to.

"Window frames should be set while the tile is being laid, and if you wish a substantial job, leave a vacancy of from 4 to 6 in. between tile and window sill. Before the window frame is set drive a few nails in the bottom of the sill, leaving one-half of each exposed, then make a form for concrete sills, and tamp the concrete around the heads of the nails (see Fig. 8).

"The wooden lintel over windows may be securely fastened by driving nails into the top and leaving a part of them exposed and

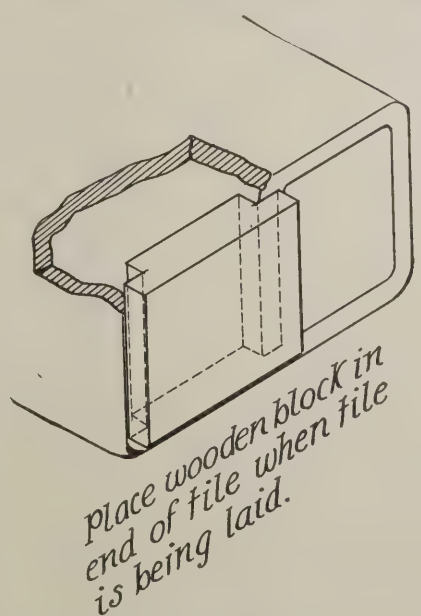
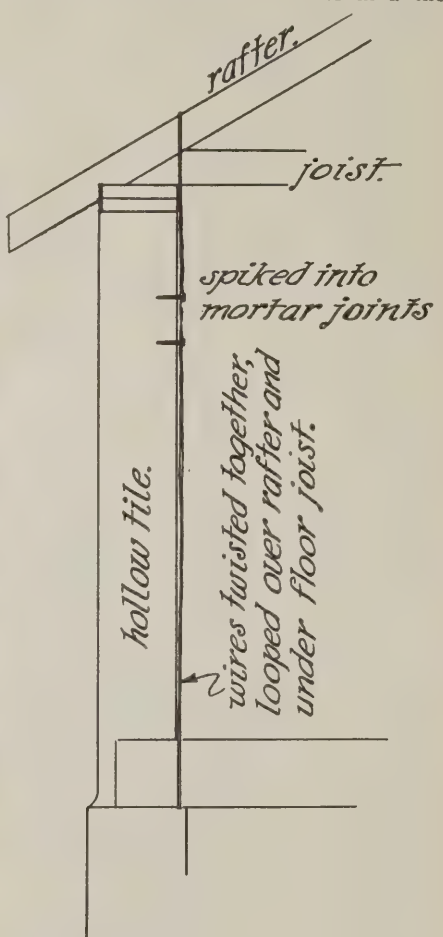


Fig. 6—Special block for tile



Arrangement of wires for tying roof to foundation

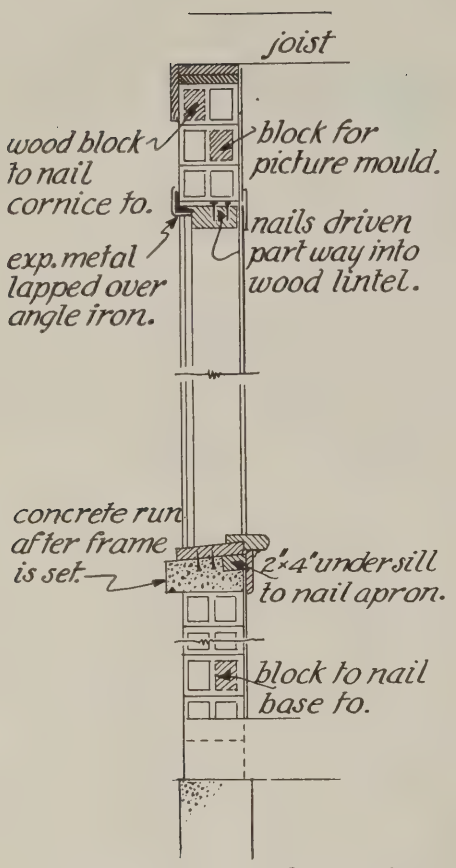

joist
wood block to nail cornice to.
block for picture mould.
nails driven part way into wood lintel.
exp. metal lapped over angle iron.
concrete run after frame is set.
2"x4" undersill to nail apron.
block to nail base to.

Fig. 8—Detail of window opening

the mortar pressed around them. The inside and outside window cap should be nailed to this wooden lintel.

"All openings in a tile building should have at least 3 in. x 4 in. angle iron. If the walls are stuccoed these angle irons must be covered with metal lath. The metal lath may be nailed to the top of brick mould, or window cap, and then bent over top of angle iron, before tile is laid (see Fig. 8).

Overcoming Plastering Faults

R. L., of Nunda, N. Y., with the experience of 37 years, writes that he has had "more or less bad luck with patent plasters, and most of it has been caused by bad lathing, or plastering on too dry lath."

In regard to the treatment of lath for hard plaster, he says: "These days when we get all kinds of wood lath, hemlock, hard pine, fir, spruce, etc., mixed, there is trouble with the plaster cracking and bulging. The plaster companies give directions as to mixing, clean water, box, and not too much water at a time, etc. But they all fail to say much about lath and lathing.

"In the first place the lath should be spaced so a good clinch can be had on all work, 3/16 in. on side walls, and ¼ in. on ceilings. Joints should be broken every eight or ten lath, and the ends parted so that the cross-grained lath can swell end ways without bulging. Then ten or more hours before the first coat is applied the lath should be wet thoroughly with hose or spray pump. Don't leave any dry places in the corners or angles. If the lath are very dry wet them the second time four or five hours before plastering.

"I have seen lath that bulged and cracked after the second coat was on, caused by the first coat drying out too fast for the moisture to swell the lath and causing trouble. It generally meant a patch on a new ceiling. I use a pail pump, as it doesn't get as much water on the floors."

Anticipating Heating Troubles

AFTER the local and long-distance weather prophets had wasted their breath predicting a mild February, and after experiencing mild weather for Alaska, this letter from S. R. T. may prove of interest. It comes with a sixty-knot breeze and six below zero, but it has to do with house-heating.

"For the number of kickers we meet during the cold weather it seems likely that every house built and sold is a 'cold' house. When we come to boil down the complaints, complaints against our own houses and somebody else's houses, we find that most of the kickers are just kickers, and many don't know how to run a heating plant, and some will not burn the coal.

"Some complaints are real, and the trouble should be corrected without much difficulty if the heating plant is large enough to take care of the house. I want to tell of a scheme I have when building houses heated by furnace. These houses are the real trouble makers. I use one of the many rules given for furnace size, taking into account the location of the house, etc., whether storm-sash or patent weather stripping is to be used, and absence of wind-brakes. Then I see that the humidifier is put on where it will be of some value, and where the water it contains will be evaporated even in mild weather. That is where the trouble comes.

"The steam heated house generally is all right if steam is allowed to escape from the radiators. The hot-water heating plant is pretty dry unless humidifiers are used all over the house. But both of these plants usually supply more heat than is required even with the air dry. With a furnace, say for a small house of about 10,000 cu. ft., at least six quarts of water should be evaporated per day with the temperature near freezing, and ten quarts when the temperature is anywhere near zero. The cold weather is almost always dry weather and a furnace heated house is easily affected.

"Some tinners put the water tanks so low that there is not enough heat to help evaporation. Put the tank up to the level of the grate at least. Some put it over the fire-door. Then before turning over the house, take special pains to inspect everything about the heating plant from the ash pit up. If you find a little more pitch can be given to an air duct, have it replaced. Be sure one or two risers will not out-pull all the rest. But be certain that you are going to evaporate enough water.

"When the owner takes possession go over the plant with him. Explain its little shortcomings if it isn't treated right, but explain very carefully how to treat it right. Get him to promise to keep track of he evaporation, and tell him the theory of same, that, if his windows are not protected by storm windows, the lower glass temperature will cause the moisture to collect as frost on the panes and require more evaporation. Most owners know very little about keeping themselves warm, and I sometimes think that some builders could take lessons."

Method of Laying Slate-Covered Roll Roofing

THE illustration herewith shows how very effective results may be obtained in the use of ordinary slate-covered roll roofing. There is nothing new in this, for reference to the files of NATIONAL BUILDER eight or ten years ago shows that the same method was described and illustrated at that time. However, the pictures of the very pretty little houses designed and built

Laying slate-covered roll roofing to get the effect shown in Style Sheet pictures of Magill houses, Rye, N. Y.

by the Magill brothers of Rye, N. Y., shown in this and the February issue of NATIONAL BUILDER recall the possibilities of this simple and inexpensive roofing material.

The roll of roofing is unrolled across the roof, face down. It is fastened along the lower edge by a lath nailed in place with plenty of overlap on the roll below. The sheet is then folded back over the lath, giving the rounded edge. These roofs are used both with and without the rolled eaves effect. Some of those shown on the houses in the February issue of NATIONAL BUILDER have given seven years of very satisfactory service, and are still good.

Paint as an Aid to Renting and Selling

1. The Protective Quality as Applied to Exteriors

By Albert Brace

WHILE paint for interiors may be chosen with the thought of decoration uppermost, selection of an exterior paint should be based first and foremost on its ability to protect and preserve. If the builder sells and the outside coats of one project soon show evidences of shoddy materials, he can hardly expect the purchaser in question to go about solicitously muffling the fact; if the builder rents, then it is a question of the most immediate self-interest to see to it that both the paint and its manner of application are of the first quality.

So far as materials are concerned, there is for the builder thoroughly impressed with these facts, a variety of good, ready-mixed paints with which he cannot go wrong; there are also, unfortunately, temptations in the form of paints frankly made to meet a price and not a standard. That they exist, it must be confessed, is due to an element existing everywhere who must and will be provided with something that comes within their meaning of a bargain, "something that doesn't cost much but will do the work."

What Constitutes the Best

So far as the "Prepared" versus "Paddled Paint" controversy is concerned, there is very little to it for the builder. The merits of white lead in oil are conceded by everyone and all ready-mixed paint of the grades dealt with here contain it in large part. Such contention as exists derives itself from the claim of the machine made paint maker, on the one hand, that certain other pigments added to white lead improve it, and the claim of the white lead corroder, on the other hand, that no additions are necessary except possibly zinc in some climates. That is the difference in a nutshell, and it is complicated only by the conflicting claims of the rival paint manufacturers themselves as to the strengthening influence exerted by their particular pigment additions.

The liquids used in all ready-made house paints and in hand-mixed lead and oil are substantially the same, being about 95 per cent linseed oil and the remainder turpentine and japan drier. Properly assuming the linseed oil to be pure in all cases the question of the paint's protective and decorative qualities lies largely with the pigments; the oil simply serves to bind them together and hold them to the surface. Hence, the oil may be said to constitute the life of the paint protection and the pigments the degree of it.

Paint Pigments

White lead, i. e., basic carbonate of lead, is the most opaque of white paint pigments; it combines readily with linseed oil, increases its drying powers and when mixed with it to painting consistency, flows out readily under the brush.

Zinc is a strengthener—at one time when its properties were first realized, it was thought that it might take the place of white lead. Finer in texture it is also whiter and where lead is soft, zinc is hard so that it makes an ideal reinforcing agent when added in proper proportions. It cannot be used alone with linseed oil for the reason that being hard, it refuses to expand and contract with the wood under changes of temperature, so that cracking and scaling result. Most paint manufacturers, and we are speaking always of the conscientious leaders, add about 20 to 30 per cent to the lead—some even go to the extent of using them half and half.

White lead and oil mixed by hand

A typical high-grade prepared paint

For a time even the most progressive manufacturers thought 75 per cent of lead and 25 per cent of zinc fulfilled the maximum requirements of a paint's pigment content. The laboratories, however, refused to be satisfied and learned from protracted tests the virtues of *small* additions of such pigments as silica, barium sulphate, china clay, whiting, etc. Convinced of the advantages of using these inert pigments (they have no chemical affinity for linseed oil or action on lead or zinc) the reputable manufacturer long hesitated to incorporate them for the reason that being far cheaper than the standard pigments, they served to tempt the "dope" paint manufacturers to using them in unduly large proportions as a means of bringing down the cost and raking in a longer profit or of underselling to the unsuspecting. Hence, the undeserved black eye given the otherwise meritorious inert pigments—adulterants when used to displace lead or zinc, reinforcing agents when used in scientifically calculated proportions. Government specifications allow as high as 15 per cent of them.

Liquids for Paints

Linseed oil, as has been said, constitutes the life of the paint. There are various adulterants for it, and this is an additional reason why many painters prefer to make sure by buying lead and oil separately; however, reputable prepared paint manufacturers incorporate fully as pure a grade in their products so no fear need be felt in that quarter. Turpentine, which gives easier spreading and greater penetrating qualities, as well as drier, are used in good mixed paint in about the same proportions as in hand made. It should be noted that the paint laboratory is equipped to inspect each of these ingredients for quality and uniformity in a way that the painter himself could not do, however scrupulous and exacting.

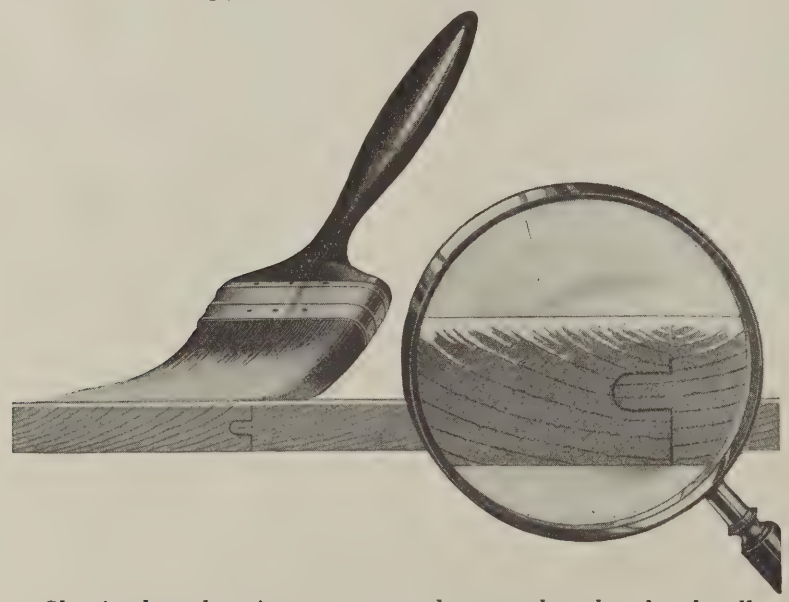
The Application of Paint

To get the full protective value of paint, even though it be of unquestioned quality, it must be properly applied.

Generally speaking, all new lumber should receive at least three coats: priming, middle and finishing. Of these the first deserves the closest attention for the reason that any mistakes in it are beyond rectification merely by swabbing other coats over it. The nature of the wood has much bearing on the matter, and while these differences will be

covered in detail later on, it may be said that if extra green, sappy or resinous, it should be allowed to weather in its natural state for from three to five months before any painting is done. For as the veriest tyro of a painter knows, any surface to be painted must be absolutely dry—the drier the better. If it has just rained or snowed or bids fair to at the time of application, all work should be halted no matter how urgent the question of completion, for no paint will adhere to a wet surface and the same is true of one smeared with grease, tar or other foreign matter.

Assuming that the lumber is dry and the temperature right, there are still other factors to consider before the priming coat is applied. All plaster on the inside must be thoroughly dried, for new plaster contains a large proportion of water, and this the sun's heat tends to draw out through the side of the building, causing the paint, if it is already on, to peel. And then there are the knot holes—all sorts of treatments for these trouble makers have been suggested from applications of white lead, oil and turpentine, followed by gold leaf to hot ironing and shellac. This last has been for a long time the prevailing practice for the reason that it sealed up, but of late it has been shown that shellac not only fails to offer a "tooth," but, being brittle, tends to crack off and take the paint with it. Modern methods call for daubing these spots with turpentine, which by cutting the resin, to a large extent neutralizes its potentialities for later harm, does not crack and does not offer a slick surface for the brush to slide over.



Showing how the primary coat must be properly reduced and well brushed to penetrate new lumber

The Nature of the Priming Coat

If the lumber is not too sappy or resinous and the paint work cannot be delayed, in order to give the priming coat an anchorage, some authorities recommend the application of a coat of solvent naptha a moment or two ahead of the paint. To simplify this, still others add a pint of the solvent naptha to a gallon of the primer. Painters who notoriously underbid all competitors have a habit of using cheap materials in the priming coat, thinned down left overs from old paint pots, yellow ochre, and so forth. Mixed paint containers bear full directions for thinning their contents and nothing else should be substituted or added if that brand is to be used for the succeeding coats. The priming coats should be thin and brushed into the new lumber with plenty of elbow grease. The degree and nature of the thinning depends on the character of the lumber; generally speaking, the following rules should govern:

White Pine, while the most satisfactory wood for building construction from the carpenter's and painter' point of view, has acquired considerable scarcity. The priming coat should be thinned with a pint of raw linseed oil and from a pint and a half to a quart of turpentine to the gallon of paint.

Poplar is another satisfactory wood so far as paint work is concerned and reduction of the priming coat should closely follow the rules applicable to White Pine.

Cotton wood, being soft and spongy absorbs moisture readily, and for this reason should not be allowed to weather but be painted as quickly as possible. Two coats will often suffice, the first reduced with a quart of raw linseed oil and a pint of turpentine to the gallon.

Bass wood also can be protected with two coats, the first being thinned with one quart of raw linseed oil and one pint of turpentine to the gallon.

Gum wood absorbs paint slowly and is more often used for trim than body. Two coast are sufficient, the first thinned to the extent of a half gallon of linseed oil and a pint and a half of turpentine to the gallon.

Spruce greatly resembles White Pine, but is unfortunately blessed with pitch pockets and does not absorb paint as readily. Three thin coats give best results, the priming coat being reduced with a pint of raw linseed oil and a quart of turpentine, the middle coat with a pint and a half of the latter to the gallon.

White Cedar absorbs paint uniformly but slowly. The first two coats should be thinned as follows: priming, one quart linseed oil and one pint turpentine to the gallon; the middle, one and one half pints turpentine.

California, Oregon, Washington and Red Cedar all call for three coats, the first reduced with a quart of raw linseed oil and a pint and a half of turpentine to the gallon, the second with a pint and a half of turpentine alone. Red Cedar must be thoroughly seasoned as it contains an oil that breaks up the binding qualities of the paint; plenty of drying time should be given between all coats.

Cypress is one of the most difficult of lumber surfaces to paint for though very durable, it requires long seasoning and even then retains an oily sap, which is best neutralized by adding a quart of turpentine to the priming coat. A pint of raw linseed oil should also be added and for the second coat a pint and a half of turpentine to the gallon of paint. Some experts recommend even a greater proportion of turpentine thinning, but we are dealing as far as possible with average products and conditions.

Red wood is very dark in color and for this reason, especially where the paint is white, requires three coats for proper hiding. Reduction of the first two coats is the same as for Cypress.

Birch is only occasionally used for exterior construction, but when so employed gives an excellent base for paint. Two coats will often suffice, the priming coat thinned with three pints of raw linseed oil, and a pint of turpentine to the gallon. For three-coat work, the middle coat is reduced with a half pint of raw linseed oil and a pint and a half of turpentine.

Hemlock does not take paint well, absorbing it unevenly and slowly. The priming coat must be brushed in with plenty of elbow grease and thinned to the same extent as Cypress.

Oregon Pine and **Oregon Fir** call for practically the same priming and middle coat treatment as Cypress.

Chestnut absorbs paint slowly and calls for three coats, the first thinned with a quart of raw linseed oil and a pint and a half of turpentine to the gallon, the second in the same way.

Hard Pine is also known by various other names: Yellow Pine, Georgia Pine, Norway Pine, Red Pine, etc., but by any name is just as hard to paint. Its uncertain texture causes it to be soft and porous in one place, hard and resinous in another, all on the same building; consequently absorption varies accordingly, and the reduction of the priming coat must be based on a study of the condition of the surface. It is best to allow the building to weather for a short period then apply the first coat evenly and with pressure, thinned with a pint of raw linseed oil and a quart of turpentine to the gallon of paint. Three coats are best, the second reduced with a pint and a half of turpentine; two heavy coats tend to break away and scale.

Long leaf yellow pine is the tree from which turpentine is produced. Consequently, the lumber when used in building construction and acted upon by the sun's rays, oozes out the virgin turpentine. Being a solvent of oil it cuts the vitality of the paint and destroys its life; only trouble results from trying to cover this wood with heavy paint coatings.

(To be continued)

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You know Johnson's Floor Wax—it's used all over the civilized world for polishing hard and soft wood floors. We want you to know Johnson's Floor Varnish, too. Our Varnish is just as good as our Wax. Johnson's Floor Varnish is easy to apply and has good body. It dries free from dust in two hours, and hard over night—gives a beautiful, high gloss which will not chip, check, mar, blister or scratch white—has great elasticity—is very pale in color—and waterproof. Johnson's Floor Varnish is a splendid all-purpose varnish. Use it not only for floors, but for trim and furniture. May be rubbed if desired.

"Made to Walk On"

Johnson's Floor Varnish is tough, elastic and durable. It gives a beautiful, high gloss which will not chip, check, mar, blister or scratch white. It is very pale in color so can be used on the lightest floors and linoleums.

Dries Hard Over Night

Johnson's Floor Varnish dries free from dust in two hours and hard over night. It imparts a beautiful, high lustre—has good body—will give long wear—is absolutely water proof—and will stand all reasonable tests.

Announcements and Publications

The Portland Cement Association has issued a new booklet in their series treating with concrete construction. The title is "Foundations, Walls and Basements of Concrete," and much valuable information is presented on these topics. The subject matter deals with small building foundations both of the monolithic and cement block type and in addition to various construction details, methods of calculating loadings and quantities, and some helpful tables for finding the quantities of cement, sand and stone of mixtures of various proportions and the materials required for 100 sq. ft. of surface for varying thicknesses of concrete or mortar, are given. The tables are fully explained and actual examples of their use are given. The treatment of foundation forms is especially interesting as is the method of installing bolts in a concrete machine foundation and the method of foundation layout. The pamphlet is free and may be had upon application to the Association, the address of which is 111 West Washington Street, Chicago, Ill.

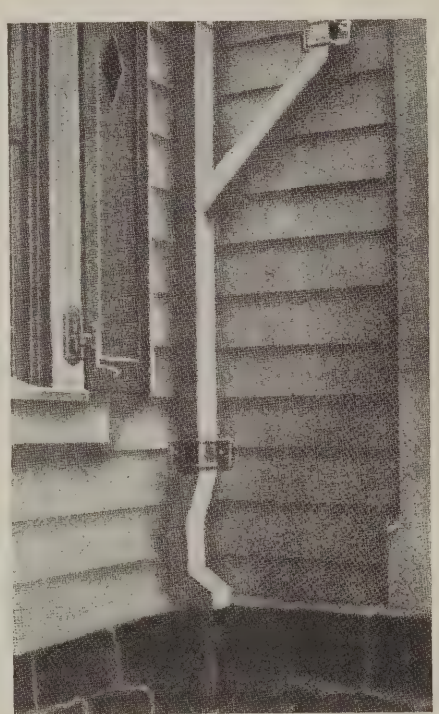
"Recommended Minimum Requirements for Small Dwelling Construction" is the name of a 108-page, paper-bound book recently issued by the Bureau of Standards, Department of Commerce, Washington, D. C. The subject matter, which treats with details of best building practice regarding small dwellings, intended for the occupancy of not more than two families, should be of great help to every builder and contractor who is interested in the latest developments regarding proper construction.

The text matter treats with the findings of the Building Code Committee of the Department of Commerce, a committee of experts formed to investigate the wide diversity of the various building codes throughout the United States with a view to effect possible economies in construction costs through standardization of building-code requirements.

Among the many subjects treated are brick walls, solid and hollow, frame, brick veneer, and hollow-tile construction, party and division walls, foundations, loading requirements for floors and roofs, plastering, chimney construction, fire-stopping and combined dwellings and garages. The chapters on wood framing, plastering, chimney construction and fire-stopping are especially interesting and contain a wealth of information to anyone interested in erecting better buildings. The entire book is illustrated with many drawings and plates and is written throughout in simple, non-technical language. It may be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C., for 15 cents.

New Standard Moulding Book, a 57-page booklet published by the Southern Pine Association, contains full-size details of all standard mouldings and trim with standard sizes and base prices and identification number shown for each pattern. Measurements and details of bevel siding, drop siding and beaded partition material are also given. The booklet is intended to be used in ordering trim from the mills and it should prove very useful for this purpose. It may be had upon application to the Southern Pine Association, New Orleans, La.

Lupton Service Products' Catalog No. 11 is a 191-page book of information published by David Lupton's Sons Co., Philadelphia, Pa., treating with the line of steel sash, doors, roof trusses, partitions, etc. Much useful data regarding the manufacture, construction details and methods for erection are contained in the book and it should be of interest to anyone using this class of material. It will be sent free to any builder or architect upon application to the publishers.



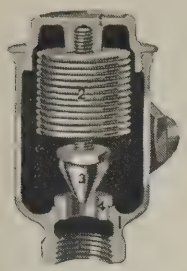
Copper downspout 76 years old

How to Build a Better Home—This is a book of suggestions for home builders, but it contains many pointers of interest to the contractor, architect and builder as well; as for example, contracts and "extras" and finance. The roof, plumbing, hardware and heating plant are given special consideration, particularly so far as copper, brass or bronze for these parts are concerned. Published by the Copper and Brass Research Association, 25 Broadway, New York, N. Y.

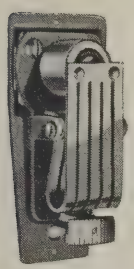
The Significance of the Fine Arts—"The Committee on Education of the American Institute of Architects has produced this book for use as a textbook in American colleges, and for general reading and study by the public, with the purpose of arousing interest in the fine arts and creating a better understanding and appreciation of them." This sentence is from the introductory chapter by a member of the committee. The book proper is divided into two parts. Part I deals with the general subject of architecture, with chapters devoted to classical architecture, the architecture of the middle ages, the renaissance and modern architecture. Part II is devoted to the allied arts, with chapters on sculpture, painting, landscape design, city planning, the industrial arts and music, and an epilogue on the "Significance of Art." Each of the ten chapters of the book is written by an architect or artist who has devoted most of his attention to the subject of which he treats, as for examples, Ralph Adams Cram on the architecture of the middle ages, and Lorado Taft on sculpture. It contains 483 pages, with 128 page plates, printed in legible type on good stock and bound in blue cloth stamped in gold. Marshall Jones Co., Boston, Mass.; $3.50 net.

To Help You Sell the Barnett System—About 24 per cent of NATIONAL BUILDER's subscribers have the agency for one or more building materials, accessories or equipment. Many of them do a good business in lightning rods. Jos. Barnett & Co., Cedar Rapids, Iowa, manufacturers of a copper cable rod made up of many wires twisted together, have a little handbook for their agents, with the above title. It is a regular sales manual and contains in addition instructions for installing the Barnett rods and fixtures.

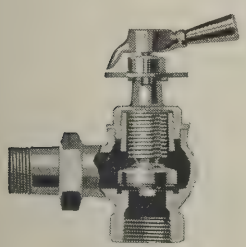
Modern Fireplaces of Colonial Charm—Strange as it may seem to some, there are many houses in this country heated only by hearth fires. In every home the fireplace should still hold for its occupants the fondest of memories as the center of the family circle. The Colonial Fireplace Co., 4611 Roosevelt Road, Chicago, Ill., have published a catalog of their fireplace equipment which recognizes both the utilitarian and the esthetic side of the fireplace. They sell everything from the mantel to damper, and offer a wide variety of patterns in all articles.



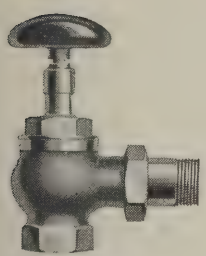
Bishop-Babcock
Multiflex Trap



Bishop-Babcock
All-Metal Thermostat



Bishop-Babcock
Modulation Valve



Bishop-Babcock
Multiflex Valve

Charles Platt, Architect John Gill & Sons, General Contractors

Meyer, Strong & Jones, Heating Engineers W. G. Cornell & Co., Heating Contractors

The experience of the Hanna Building

with Bishop-Babcock Multiflex Traps

THAT Bishop-Babcock Heating Equipment and Temperature Control are accorded the highest recognition by leading architects and engineers is proved again by the use of this equipment in the Hanna Building, Cleveland. Mr. J. E. Flury, Chief Engineer of this building, writes:

"Regarding the operation and efficiency of the heating system in the Hanna Building, Hanna Building Annex and Hanna Theatre, and the working of the Bishop-Babcock Multiflex Thermostatic Traps, I have operated the above systems for two seasons and have not experienced any trouble in maintaining a uniform circulation and a steady vacuum as to the Multiflex Traps. They have not given us any trouble, either in our direct or indirect system."

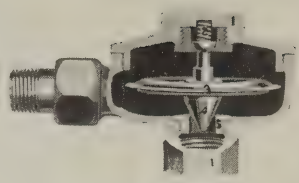
May we send you additional facts?

THE BISHOP & BABCOCK COMPANY
Cleveland, Ohio

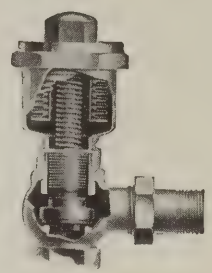
Bishop-Babcock Heating Systems

for all standard installations for temperature control installations

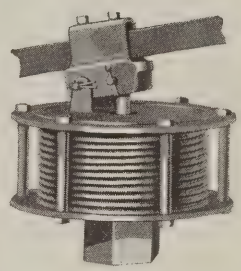
World's Most Complete Line of Heating Specialties



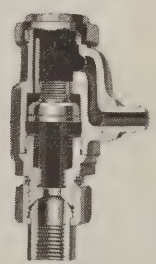
Bishop-Babcock
Vacu-Trap



Bishop-Babcock
Pneumatic Valve



Bishop-Babcock
Steam Damper Regulator



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Vacu-Stat

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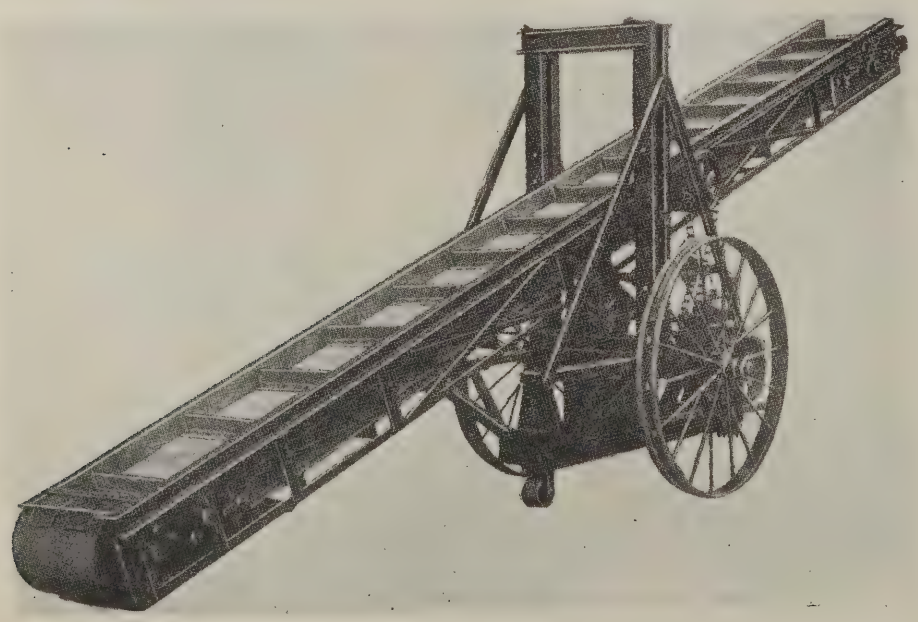
Buyers' Guide for Builders

What Manufacturers of Materials, Equipment and Machinery for Building Construction Are Doing for the Industry

Portable Belt Conveyors

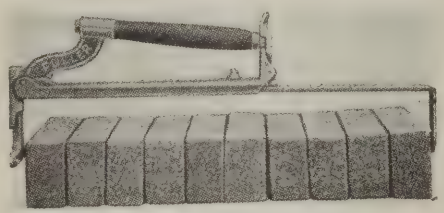
ECONOMICAL handling of materials means lower building costs. Loading and unloading and transporting materials by common labor which is more or less difficult to obtain is not only slow and costly in itself but frequently holds up the work of the various craftsmen in waiting for material. This condition gives point to the saying, "If you need a thing, you pay for it whether you buy it or not." Among the labor-cost and time reducers the portable conveyor offers contractors immediate and permanent advantages. Records show the low cost and saving secured by the portable belt conveyor to be: Unloading, five cents a ton, a saving over hand labor of 25 cents a ton. Average cost of loading and storing, four and one-half cents a ton, or a saving over hand labor of 24 cents a ton. The portable belt conveyor handles coal, coke, stone, sand, gravel, earth, clay, grain of all kinds, boxes, tile and bagged material. The construction of the belt conveyor and its design provide for modifications classified according to the material to be handled and the power used. The parts are of a strength insuring great durability but so designed that repairs can be quickly and economically made. The Maroa Manufacturing Company, Maroa, Illinois, which has 21 years of practical experience, invites consultation regarding material handling and piling problems, and offers to send suggestive blueprints free upon request.



Maroa portable belt conveyor

A New Brick Carrier

AS every workman knows, bricks are not easy to handle. Some sort of carrier is necessary for fast work. A new device called the Fuller Brikarier, recently put on the market by the Builders' Material Co., Cedar Rapids, Iowa, does much to simplify the handling of all kinds of brick and building tile. It costs a little more than the common carrier, but has points of superiority that are claimed to make it worth the difference. It is stated that with this carrier, one hand can do the work of two; that loads of any size from six to ten bricks are perfectly balanced; and that the carrier releases without extra motion or use of the other hand.

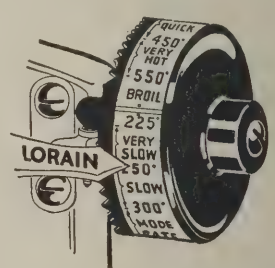


The Brikarier extended and ready to be placed in position. A catch holds the handle down until released by the thumb

Eliminating Cooking by Guess

NATIONAL BUILDER has repeatedly made mention of builders who install cook stoves in their houses and apartments as a means of making sales easier. The practice is growing in importance daily, for the alert builder is quick to take up new ideas that appeal to the prospective buyer or tenant and what is there that makes as big a hit with the housewife as a good cook stove? The woman who does her own housework finds this sort of equipment in the new home almost irresistible.

Now comes the ultra-modern builder taking advantage not only of the cook stove itself but of the oven heat regulator for its automatic control. An especially efficient instrument, the "Lorain," is a standard part on a half-dozen well-known lines of stoves —Reliable, New Process, Dangler, Quick Meal, Clarke Jewel and Direct Action. This device is an automatic attachment consisting of a thermostat located in the top of the oven, which, by expansion of metals when heated, controls the oven heat automatically by regulating the flow of gas. Such ovens are equipped with a notched wheel on the side of the oven, which may be set to any of the temperatures indicated on it.



Oven-heat regulator

It is claimed for the "Lorain" oven heat regulator, that with it the housewife can eliminate most of the guesswork in cooking. Directions are given her for the proper temperatures to be maintained for cooking different foods, and by setting the regulator to hold those temperatures, she can go about her other work with worry off her mind. The regulator is a work and worry saver at canning time and on baking days as well as in ordinary cooking.

Air Compressors

PNEUMATIC tools for both large and small work are steadily taking a larger place in construction work in reducing costs and speeding up work. The announcement by the Ingersoll-Rand Company, 11 Broadway, New York, of a new line of small vertical belt driven air compressors will be of inter-

Make More Money-Be a Bigger Builder

The Good Things—the Big Things—of Life are for those who will reach out for them. You can have them for the grasping—just an energetic thought—saying "I Will" and they are yours. Are you content to make a small profit slowly on hand labor or—will you make a large profit quickly by means of a modern machine? Which?

IT'S EASY

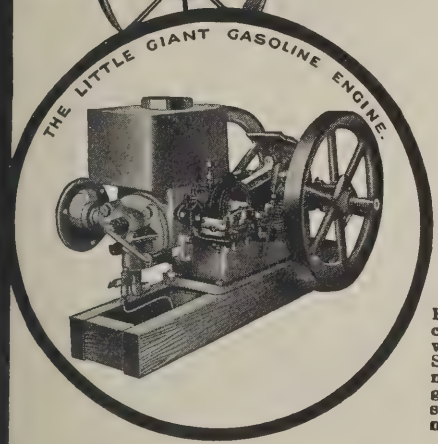
Let The Magic Mixer-Mix Your Concrete

Does it faster—better—cheaper

This Mixer will put you in position to do all kinds and classes of concrete work. It will enable you to work faster, do more work, do bigger work, do better work—and will help you build up a permanent and substantial business.

$25 BRINGS IT TO YOU

Balance on Aloe's Easy Rental Purchase Plan—you have TEN MONTHS TO PAY—and the mixer will be making money for you faster than the easy payments come due. Certainly this is a rare opportunity for you to get away from the old shovel method and get into the class of the big men who are doing the big jobs in the modern way.



Your Big Opportunity For Greater Prosperity

With this wonderful machine and two men you can do as much work as you formerly did with six men. And you can do it easier, quicker and better, producing an absolutely uniform batch every time. It will mix 4½ to 5½ cubic feet per batch—can be speeded up to a batch every minute—over 2,000 cubic feet per day. It is the most practical and efficient mixer made—scientifically constructed of the best materials—light in weight, portable, simple and durable. Backed by the Aloe iron-clad guarantee to give the utmost service and satisfaction.

The Engine

Fitted with 2½ horse-power four cycle, horizontal gasoline engine with high-grade Webster magneto. Simple, powerful, reliable, economical—requires only two gallons gasoline a day. Protected by all-steel housing. Two doors at rear make it easy to get at.

Anyone Can Run It

Nothing complicated—nothing to get out of order. Can be operated by anyone who will read and follow the simple directions which are furnished with each mixer. It comes complete—ready for work the day you get it.

Free Trial Offer

So confident are we the Magic Mixer will please you in every way we will gladly send it to you for 10 DAYS FREE TRIAL on payment of only $25.00. Take it out on your jobs—put it to the most severe tests. Then, if you can be induced to part with it again ship it back at our expense—and we will promptly return your money without a word.

Get This Free Book
"The Concrete Road to Success"

You ought to have this booklet of invaluable facts about the wonderful opportunities the Magic Mixer offers you. Sent FREE together with full particulars of our Easy Rental Purchase Plan by which the Magic Mixer will pay for itself and put you on the road to greater success at the same time. Get this remarkable offer.

Mail The Coupon Today—NOW

The road to success is open to you. The opportunity to make yourself a big man is before you. The simple act of signing and mailing this coupon may be the turning point of your career. Don't sit idly by while other men are forging to the front. Start the coupon on its way. Get the facts. The time to act is NOW.

A. S. ALOE CO.
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Send me FREE booklet, "The Concrete Road to Success", full description of the Magic Concrete Mixer and particulars of your Easy Rental Purchase Plan.

Name_____

Address_____

_____

est. The distinguishing name of Type Fifteen has been given the new line, here illustrated. In addition to the plain belt drive design (Fig. 1) each size is built as a self-contained electric motor outfit, driven through pinion and internal gears as shown in Fig. 2, or by employing the short belt drive arrangement. The compressing end and electric motor of both gear and short belt drive units are furnished mounted on a common sub-base, so that they are in no way dependent upon the foundation for correct alignment.

Several noteworthy features of construction have been incorporated, of which the "constant-level" lubrication system is the most important. Others include the constant speed unloader for plain belt drive machines; centrifugal unloader for start and stop control machines; and the increased size of the water reservoir cooling pot.

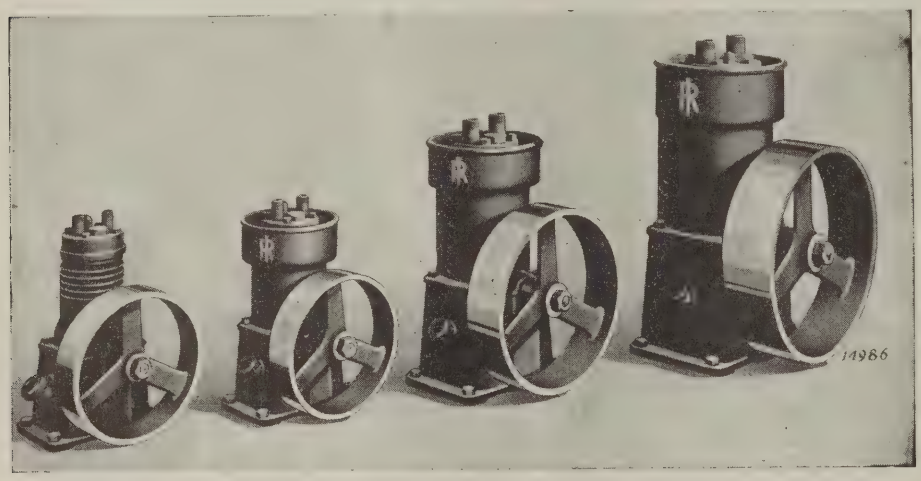


Fig. 1—The family of Type Fifteen, vertical, belt-driven air compressors, showing the 3x3-in. air-cooled, the 3x3-in., 3½x4-in. and 4½x5-in. water reservoir cooled machines

The lubrication of small vertical compressors employing the enclosed crank case and splash system has often been a source of concern wherever oil in the air is a serious menace. The tendency of the old system has been to feed too much resulting in discharged air containing excess oil, or too little causing scored cylinders, excess loads and burned out bearings.

The "constant-level" system used in Type Fifteen compressors automatically maintains a constant-level of oil, which insures the right amount being distributed to all parts.

As with the ordinary splash system, the base of the compressor forms an oil reservoir for the "constant-level" system. However, with this system, pet cocks determine the maximum and minimum amount of oil in the reservoir. Above this reservoir and directly underneath the connecting rod is a constant-level pan. Oil is pumped from the reservoir into this constant-level pan through a unique oil pump. Regardless of the amount of oil in the reservoir, so long as it is somewhere between the high and low level pet cocks, this system will function perfectly, insuring a constant-level of oil in the pan. A projecting stem on the connecting rod dips into this pan and distributes just a sufficient quantity of oil for proper lubrication.

The constant speed unloader controls the unloading of the compressor by automatically opening the inlet valve when the receiver pressure rises above that at which the unloader is set to operate. When the receiver pressure has fallen a predetermined amount, the unloader automatically releases the inlet valve and allows the compressor to return to work and thus build up the receiver pressure again.

The centrifugal unloader allows the compressor to start under "no load" such as is essential when automatic start and stop control is used, and permits the electric driving motor to come up to full speed before the load is thrown on automatically. This unloader accomplishes its purpose by holding the inlet valve open until the motor has reached full speed.

The smallest size is built with either ribbed cylinder for air cooling, where the service is intermittent, or a water jacketed cylinder of the reservoir type for constant service. All other sizes are only built with the water jacket of the reservoir type. The size of these reservoir pots is very generous, and one filling will be found sufficient for long periods of operation.

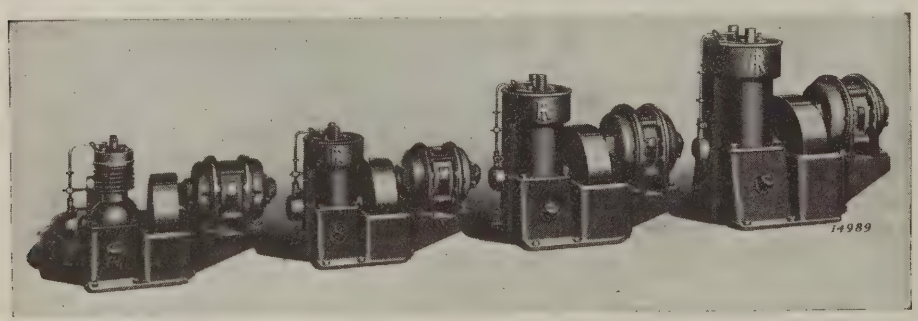
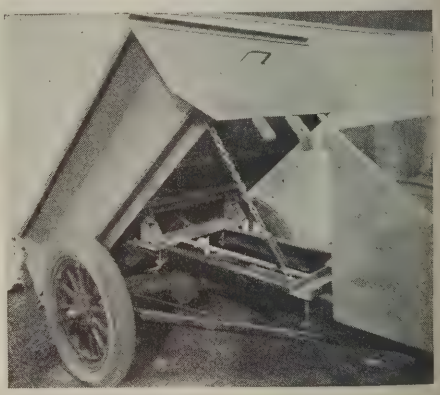


Fig. 2—The family of Type Fifteen, vertical, electrically gear-driven air compressors, showing the 3x3-in. air-cooled, the 3x3-in., 3½x4-in. and 4½x5-in. water reservoir cooled machines

Jiffy Dump Truck Body

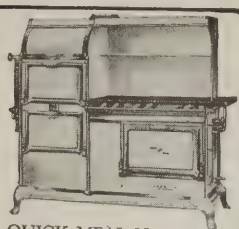
A NEW dump body for Ford one-ton trucks has just been placed on the market by the Griscom-Russell Co., 90 West Street, New York, N. Y. Its principal feature is its low height when placed on a Ford chassis, which both reduces the danger of upset and makes for easier loading. The body rests on a scale balance support about 5 in. in front of the rear axle, evenly distributing the load on the chassis. No hoist is used. The driver operates the dump body from his seat without stopping the truck. He releases a locking device and the body automatically tilts until it reaches the 45 deg. angle, at which time the tail gate automatically opens and the load dumps. The tail gate can be arranged to spread material to any desired thickness on the road and it is of the double-acting design, permitting change to express body. There is no separate sub-frame, as the sub-frame is welded directly to the all-steel body. Copies of Bulletin No. 1500 fully describing the "Jiffy" dump body in more detail can be obtained from the manufacturer.

Only one lever, and the driver releases the unlocking device from his seat



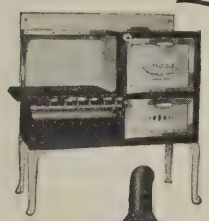
The body rests on a scale balance support

RELIABLE No. 6330

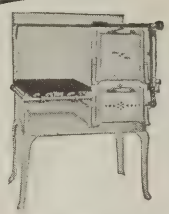


QUICK MEAL No. 22-18

RELIABLE No. 5381



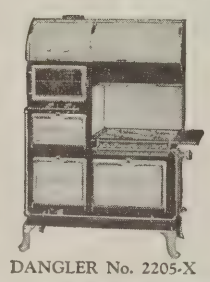
World's Largest Stock of Modern Gas Ranges



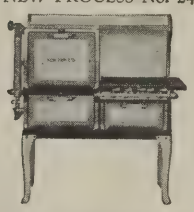
QUICK MEAL No. 9-604

WHEN specifying equipment for apartment houses, homes, schools, churches and hospitals, remember that American Stove Company offers the most complete line of improved gas stoves in the world. Not alone this—but American Stove Company is the *exclusive* manufacturer of the famous Lorain Oven Heat Regulator, the first perfect application of thermostatic control of heat to the oven of the domestic gas range. Lorain is an integral part of *only* six famous makes of stoves: Reliable, New Process, Dangler, Quick Meal, Clark Jewel and Direct Action—and marks them as the most modern cookery equipment. Because it regulates and controls the heat of the gas oven automatically—because it insures uniform baking results and eliminates "pot-watching"—and because it saves time, labor, fuel and food, Lorain has transformed the arduous task of cookery into a pleasant duty easily performed.

NEW PROCESS No. 24-18-16



DANGLER No. 2205-X



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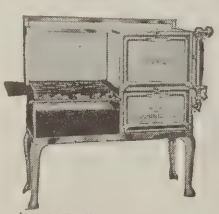
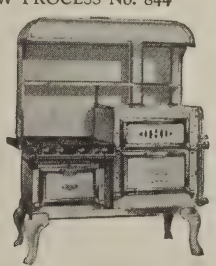
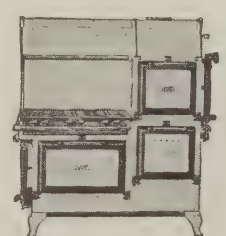


DANGLER No. 2233-X

On this page are shown but a very few of the hundreds of different styles and sizes of Lorain-equipped Gas Ranges. Catalogs, price lists and other data on request.



DIRECT ACTION No. 370-A



CLARK JEWEL No. L-624

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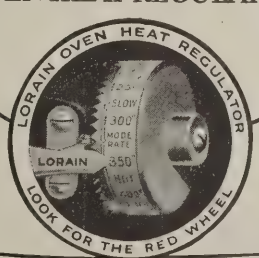

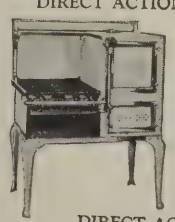

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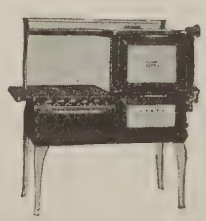
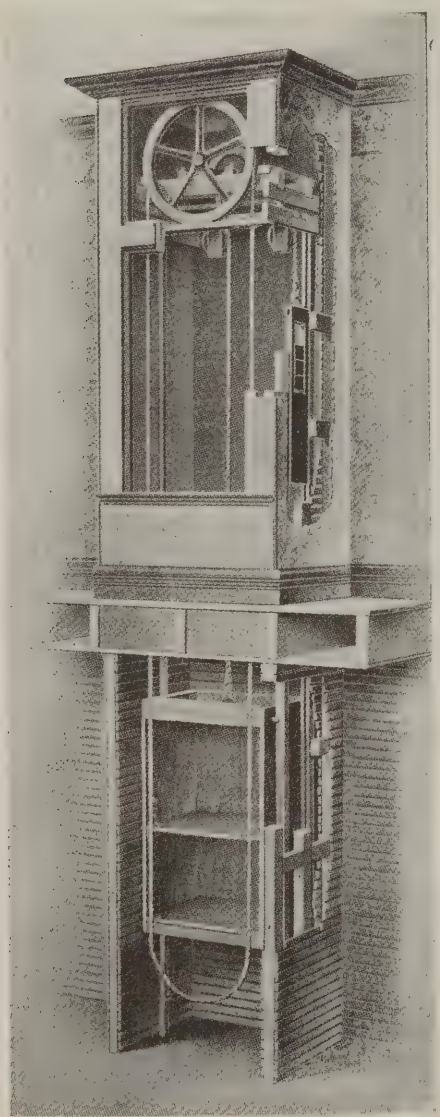


CLARK JEWEL No. R-338

Iceless Refrigerators

THOUSANDS and thousands of houses are going to be built this year in localities where neither natural nor artificial ice can be had at reasonable cost, to keep the larder cool in the hot summer months and the food from spoiling. Many families so situated utilize their basements as cold storage rooms. This means many weary trips up and down the basement stairway for the housewife and her helpers, unless something is done to avoid them.



A dumb waiter which can be used as an iceless refrigerator when properly counterbalanced

The Sedgwick Machine Works, 150 West 15th St., New York, manufacturers of a well-known line of dumb waiters and elevators, come forward with the suggestion that an ordinary dumb waiter outfit can be easily made into an "iceless refrigerator" which will be a boon to the household with a good, cool basement but no ice. "The iceless refrigerator," the catalog states, "is a cabinet in which the food may be placed and then lowered either into the cool cellar or, if the cellar be not sufficiently cool, into a prepared well or pit beneath the cellar floor is becoming more and more general because a good dumb waiter costs but little more than a good refrigerator and the saving over the use of ice is likely to pay for the dumb waiter in a season or two."

It goes on: "The only difference between one of the regular Sedgwick dumb waiter outfits and such an outfit designed to be used as an iceless refrigerator is the furnishing of a heavier counterweight which shall weigh enough to balance both the car and the average weight of food and dishes to be kept in it.

"The special advantage of the Sedgwick automatic brake dumb waiter outfit for this purpose is found in the fact that the machine is automatic and effective in both directions. If the loaded car should be heavier than the counterweight, the automatic brake prevents the car running down. If, on the other hand, so much of the load be removed that the car is lighter than the counterweight, again the automatic brake prevents the car running up. So whatever the conditions, no accident can happen. The automatic brake does not lock fast, but is applied and regulated by the inequality between the weight of counterweight and car, holding the car securely at any point, and allowing it to easily be raised and lowered."

Stairway Grilles for Return Circulation

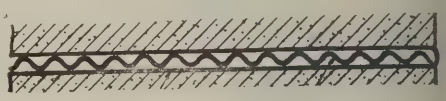
USING stair risers for return air intakes is probably something novel in warm air furnace installation, but it has been tried out with success by Chas. S. Weatherly, of Grand Rapids, Mich., says the *Warm Air Heating and Sheet Metal Journal.* The illustration shows a room in a residence which has two warm air registers at the floor line and three grilles in the stair risers. The registers are of the usual type, the upper grille of wood, the two lower ones of metal. There is a grille in the kitchen, not shown in the illustration, in the stairway risers.

The cold air from the upper hall falls into the upper grille, and the lower grilles act as an intake for the air from the rooms below.

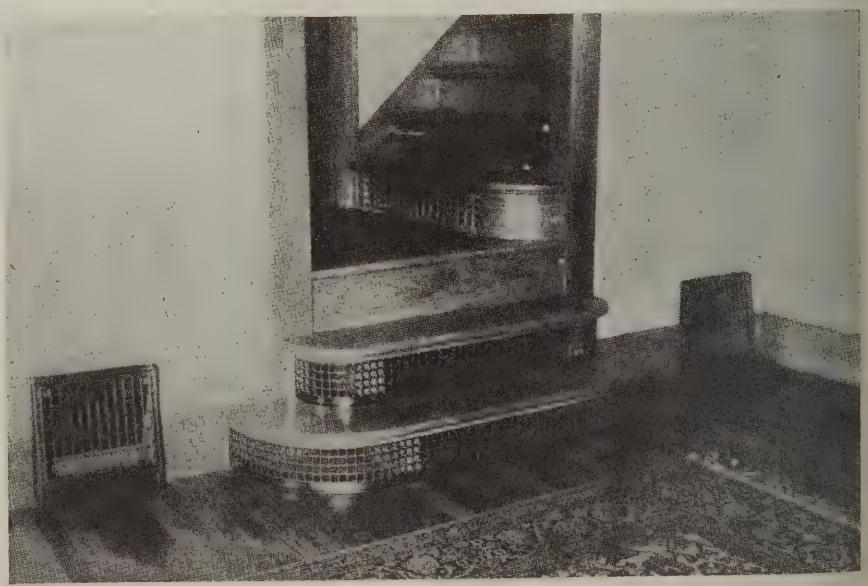
There is a galvanized iron duct under the stairs leading to the furnace; there are also two other cold air ducts from the lower part of the house. This makes a very neat arrangement, does not cut into the floors or rugs, and is entirely sanitary.

Masonry Expansion Joint

BUILDERS of stone and terra cotta facades know that secondary stresses caused by sudden temperature changes, uneven settling, shifting of loads and deflections of the steel frame work, will often cause cracking and spalling in the stone or terra cotta unless such defects are properly guarded against by relieving the pressure on the joints. The Cowing Pressure Relieving Joint Co., 189 North Clark St., Chicago, have devised a joint which they offer as a dependable preventive of trouble. This joint consists of two flat sheets of lead between which is inserted a sheet of corrugated lead. One of these joints is used in place of a mortar joint in each story. It is made the width of the stone or terra cotta facing and is designed to carry the dead weight of one story of the facing blocks without compressing. Under greater loads the joint yields, by the corrugated sheet flattening out, and thus relieves the building blocks of all secondary stresses.



A device for relieving pressure on joints in stone and terra cotta



Stairway grilles for return circulation

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Medusa Integral Waterproofing
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Medusa Cement Paint
(White and Five Colors)

There's so much keen rivalry in the housebuilding game these days that you have to put honest-to-goodness quality into their construction or else have your houses left on your hands afterwards.

The place to start the quality construction is in the basement. The concrete should be *waterproofed*—it means a lot to be able to guarantee the basement against the ill effects of underground moisture.

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Get in touch with the nearest Medusa Products dealer and write to us to send you exact specifications covering basement construction.

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MEDUSA PRODUCTS

Vacu-Vapor System of Heating

A RECENT analysis of the heating equipment which NATIONAL BUILDER's subscribers recommend for or install in the buildings that they construct, reveals the fact that some 40.6 per cent of all buildings they build are equipped with steam or hot water heat of one form or another. A recent development in heating equipment of this kind, called the Vacu-Vapor System of Steam Circulation, is worth looking into because of its many unique features. A drawing showing a typical installation appears below, through the courtesy of the Bishop & Babcock Co., Cleveland, Ohio, originators of this system.

The Vacu-Vapor system of steam circulation is a method of utilizing steam at very low pressure above the atmosphere for heating. The steam is taken directly from the boiler or central station service main, into the heating mains, and carried to the units of radiation and the air and water of condensation returned to the boiler without the use of any mechanical device or vacuum pump.

The boiler, boiler connections and supply piping are the same as for an ordinary steam plant. The steam mains branching off from the steam header on the boiler, carry the steam or vapor to the risers and laterals. The steam main pitches away from the boiler and at the end there is a drip. The water of condensation passes down to the wet return and flows back to the boiler while the air is relieved through the ½-in. vacu trap "B" into the dry return main.

The risers, laterals or run-outs lead to the units of radiation from which the steam or vapor is admitted to the radiators through a modulation valve, "A".

The air and water of condensation being heavier than steam or vapor, pass automatically through the "vacu" traps which are connected to the return end of the radiators. The "vacu" trap is normally open, to drain the radiator of air and water of condensation as fast as accumulated. When hot vapor or steam appears the "vacu" trap automatically closes. This operation is continuous and the radiators are always kept full of vapor or steam-heated to full efficiency.

The air and water of condensation, after passing out the radiators, flow through the return line by gravity back to the boiler. The air passes out through the vent valve. This valve is automatic and will not permit the return of air into the system.

Should at any time the pressure creep up on the boiler and the pressure would not permit the return of water of condensation due to the fact that static head was insufficient, the alternating receiver would then automatically return the water of condesation back to the boiler, it is claimed.

The damper regulator controls the drafts and check dampers, and, it is claimed, insures absolute control of the fire so as to maintain an even vapor pressure. With constant vapor pressure much or little heat can be supplied to any radiator by operating the modulation valve, "A". This is said to prevent overheating in mild weather, and gives abundant heat in severe weather.

No vent valves are used on radiators, so no foul odors from the boiler, piping and radiators can enter the room and there is said to be no hissing of radiators to annoy the occupants or dripping water to damage furnishings.

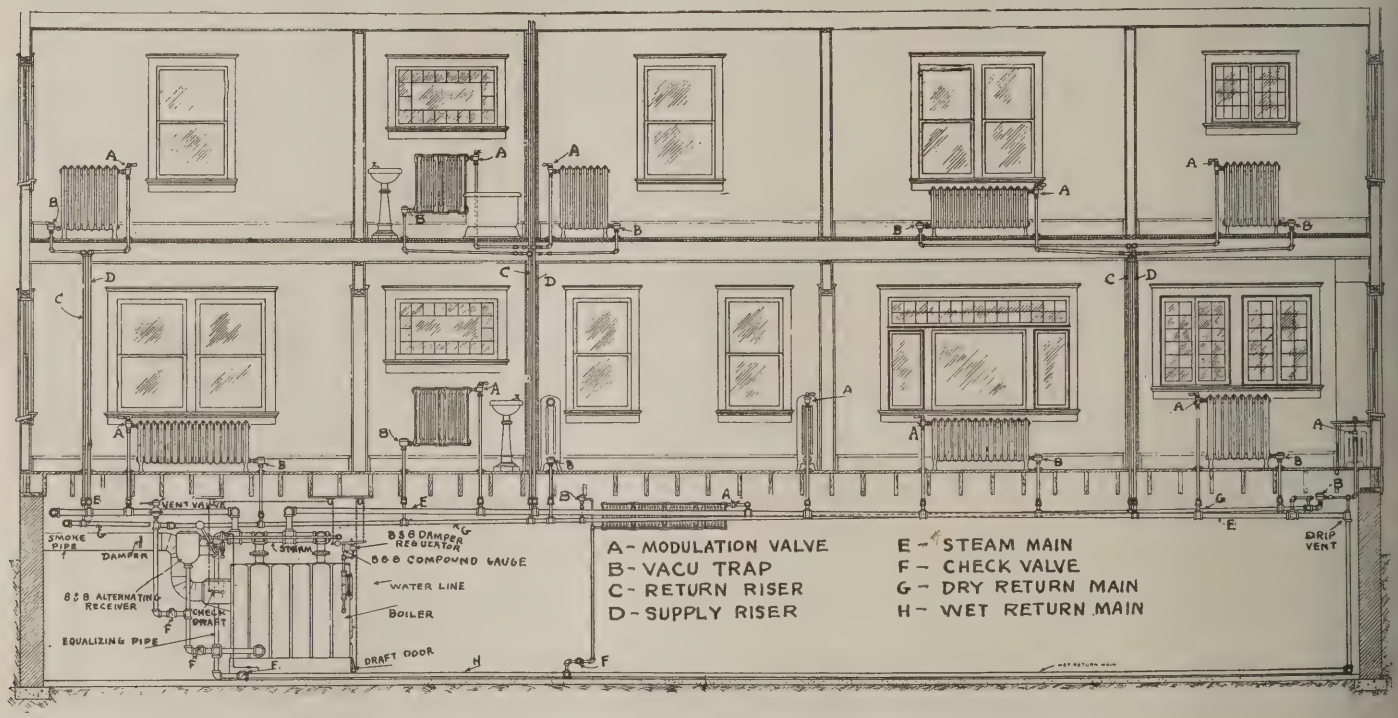

Diagram showing a typical installation of the vacu-vapor system of heating

Leather Flooring

THE latest entrant in the class of floorings is one made by the Endicott-Johnson company, manufacturers of shoes. It is called long life fibre flooring because, while the principal ingredient is ground up leather waste, it contains considerable vegetable fibre waste. The company is said to have more than 300,000 sq. ft. in use in a number of representative industrial plants. It is claimed to be fire-resistant to a remarkable degree, although it is impregnated with a coal tar waterproofing compound to drive off the moisture content and prevent buckling in damp weather. Lately another variation has been made with another compound and in this form it will be possible to manufacture the material in colors. It is laid over wood floors or over concrete, in the latter case being used to overcome surface hardness complained of by many workmen and to guard against the wearing of the surface of poorly laid concrete.—*The Improvement Bulletin.*

New Millwork Catalog

A VEST pocket catalog containing practically all the designs shown in the Universal Millwork Design Book No. 20 is now being distributed by Farley & Loetscher Mfg. Co., Dubuque, Iowa, and their associates. It is known as Miniature Design Book No. 23 and measures 3¼x6¼ in. over all.

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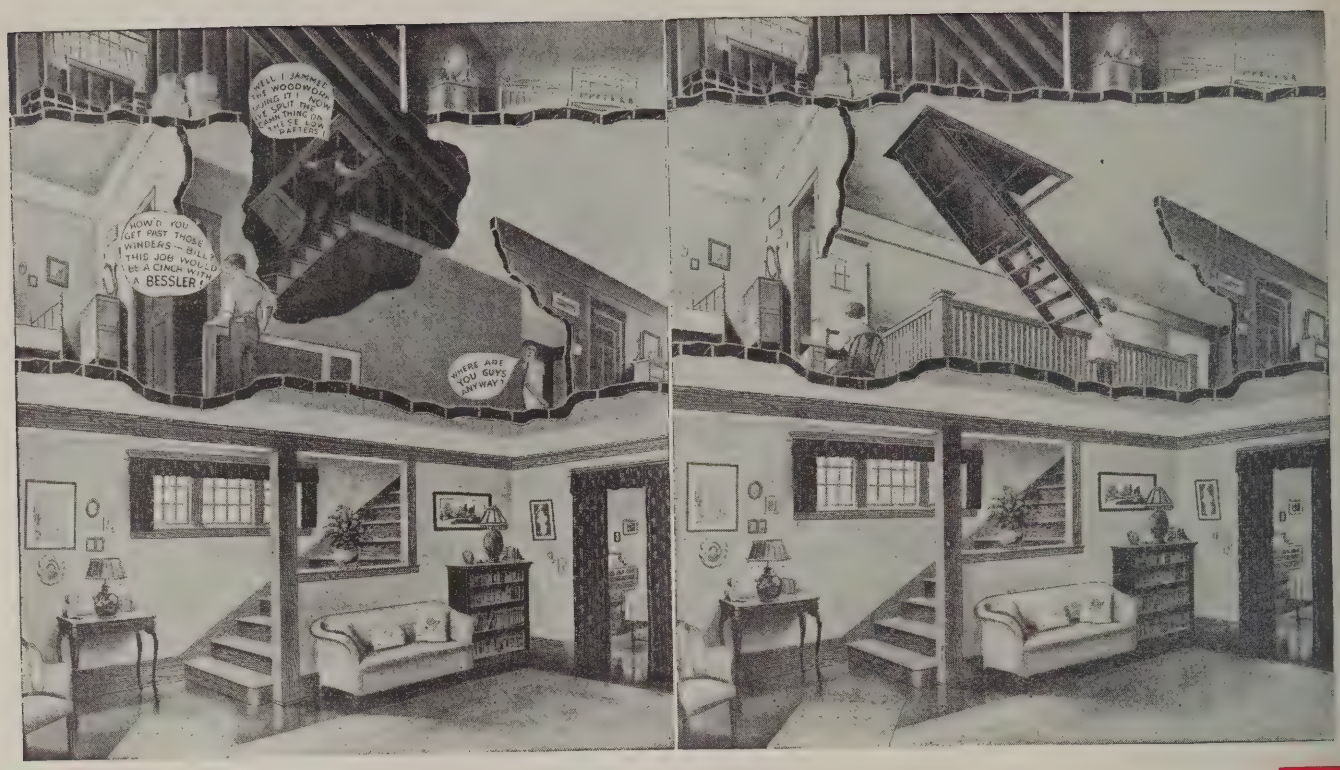
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NATIONAL BUILDER

Volume 66 CHICAGO, APRIL, 1923 Number 4

Stylish Houses of Concrete Block

Lancaster, Pennsylvania, Architects and Builders Are Achieving Reputations for Artistic and Economical Dwellings with Walls Built of Cinder-Concrete Blocks

By A. J. R. Curtis

IT is of more than passing interest in the dwelling and residential building field that in 1922 concrete was extensively used for the first time for the walls of single or isolated houses—built individually. While the building public has been acquainted at least to some extent with the successful use of concrete in some of the large housing projects, where volume of work on the same site produced conditions advantageous to quantity concrete construction methods, the building of large numbers of isolated concrete houses in very strongly competitive markets is a new and unique achievement.

Cinder Concrete Block Used

One of the most interesting concrete house developments is that in the vicinity of Lancaster, Pa., where the Lancaster Concrete Tile Co. has been actively introducing concrete masonry construction, using cinder concrete block made by the Straub system, covered with portland cement stucco. In spite of very keen competition, a remarkable year's business was achieved, as will be indicated by the ac-

Foundation walls under construction for residence of Alfred Jones, President avenue, Lancaster, Pa. Walls constructed of 12- and 8-in. cinder concrete blocks. Herman Wohlsen, contractor; Henry Boettcher, architect. (Picture of the completed house in the "Style Sheet" of this issue)

companying illustrations. (Also Style Sheet.)

The method of employing cinder-concrete block in the buildings at Lancaster is not entirely new, having been used for about 15 years in the walls of houses in various localities in a rather experimental way. The block themselves present a number of very interesting characteristics, worth discussing briefly. They are manufactured by the Straub patented process, in which superior quality steam-coal cinders are crushed to ⅜-in. size, thoroughly mixed with the cement and water in a batch mixer, molded in block machines of the pressure (not tamping) type and cured by the moist-air method.

The block is an unique member of the concrete products family, for while it is capable of carrying loads of 800 lbs. to 1000 lbs. per sq. in. on the gross cross section, the structure of the block is such that one may easily nail onto it; the weight is reduced very much below that of the standard concrete block. The normal size cinder block, measuring 8x8x16 in., as set in the wall, weighs from 32 to 36 lbs. while the standard concrete block of same size weighs 54 to 56 lbs. Where plastered on the interior surface and covered on the exterior surface with portland cement stucco, cinder-concrete block make a well-insulated and an absolutely water and weather-resistant wall.

Standardized Details Economic Factor

All of the work around Lancaster has been done according to standard details shown in accompanying illustrations. The greater number of houses, ranging in cost from $6000 to $40,000, have 12-in. and 8-in. walls consisting of a single thickness of block, plastered directly on the interior and stuccoed on the exterior with a ½-in. surfacing of portland cement stucco, applied in two coats. A certain number of houses, mostly duplex and other types of attached or "row" houses, has 8-in. block walls, to which plaster was applied directly on the inside while veneer of face brick was used on the exterior. A few unimportant structures have cinder-block walls, without exterior covering. The block all lay up to standard 8x8x16-in. size in the wall, each block occupying about the same space as 14 common brick and laying up with considerably less mortar.

Details commonly used for both stuccoed surface and brick veneer work are illustrated in the wall sections shown in Figs. 1 and 2. Double or "split" lintels, of reinforced cinder-concrete construction, are used throughout. Much of the work completed up to this time has wooden sills, but the latest structures are being fitted with concrete or face brick sills, as shown in the wall section drawings. Concrete "slip sills" are a favored type.

Further reference to the same illustrations will indicate careful attention to such important details as the "drip" projection built out in the stucco just above the grade line, in place of a masonry watertable (the latter is occasionally used) and the solid block course carrying the anchor bolts for the roof. Since practically all residence bearing walls of masonry construction are 8 in. or 12 in. thick, and partition walls 4 in. thick, the wall system as illustrated in various accompanying drawings, is designed to use only 8 and 12-in. hollow block and 4-in. solid or slab block, in the regular wall work.

Twelve-inch walls may be bonded where required with the 8-in. and 4-in. block; similarly, 8-in. walls are pilastered with 12-in. and 4-in. block. Special joist block, in both 8-in. and 12-in. widths, provide for the usual 16-in. joist spacing. Jamb block are also offered to fit either box or plank frames so as to make the junction of the masonry and the wooden or metal frames absolutely windproof and weatherproof.

It will be noted that ¼-in. horizontal and perpendicular joints are used throughout. On the horizontal joints two beds of mortar, approximately 2 in. in width are laid along the exterior edges of each block and *both* ends of each block are carefully buttered in a similar manner to produce the perpendicular joints. A 1:2½ or 1:3 cement mortar, containing a small amount of lime to aid plasticity, is commonly used in this work.

In the smaller houses the chimney construction is as shown in Fig. 5, using the multiplex type block, covered with stucco.

Residence of Christ Kunzler, West End and Buchanan avenues, Lancaster, Pa. First floor of stone and second and third floors constructed of cinder concrete blocks, half timber nailed to the blocks without the use of wooden nailing strips. Frank Roschel, contractor; C. Emlen Urban, architect

Residence of Christ Kunzler completed

Residence of A. Diffenbaugh, East King street, Lancaster, Pa. Walls constructed of 12-in. for the foundations and 8-in. above foundations of cinder concrete blocks. William Beecher, contractor; Frank Everts, architect

Residences being erected for Dr. E. S. Snyder, Columbia avenue, Lancaster, Pa. Walls constructed of cinder concrete blocks and bricks, veneered with 4 in. of clay brick. Ray Clark, contractor; Fred Krug, architect

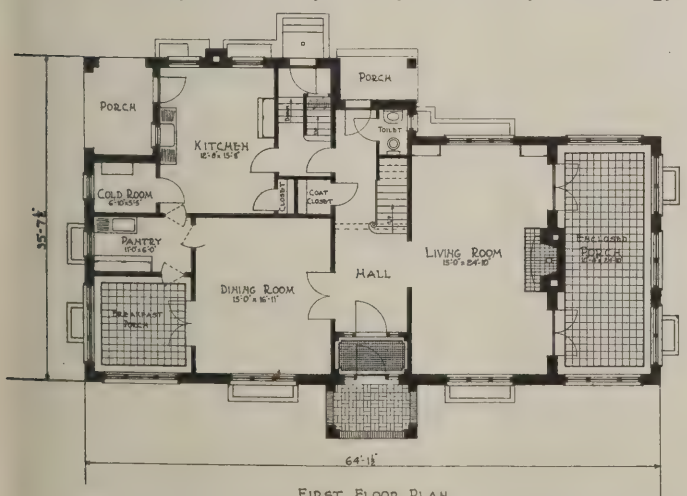
In some of the more elaborate houses a veneer of face brick is used around the chimney block and the more conservative builders use flue tile inside the block to furnish abundant protection. Experience has shown that these chimney block, well laid in cement mortar, produce chimneys which are absolutely satisfactory from a fire protection viewpoint, but the cost of flue lining is very little extra and sometimes serves to assure a doubtful owner or building inspector.

Wooden floors of the ordinary wooden type have been used in all of these residences, the joints being firmly held in position by the special joist block referred to above, which were designed especially to prevent floor movement. In locations such as around the heating plant, where the fire hazard is greater than usual, cement plaster on metal lath has been extensively employed. The block are all made so smooth that even in the most expensive houses located in the finest suburban district of that city, no plaster has been applied to the basement walls, the original surface being entirely satisfactory. In a recent inspection of many residences and other buildings built from these details around Lancaster, one is easily impressed with the fact that the basements are not only uniformally dry, but they contain no evidences of any moisture ever having gotten through.

Interesting Examples

Particularly interesting is the handsome and imposing residence of Christ Kunzler, in which the first-story walls are of fine native stone, beautifully laid up, while the second and third-story walls are of cinder-concrete block to which half-timbers were spiked and stucco applied between. The art stone entranceway, balustrade and other details are particularly noteworthy. This and a number of other beautiful houses in Lancaster were designed by C. Emlen Urban, architect, and erected by Frank Roschel, contractor.

The beautiful English house recently completed for Alfred Jones, works man-



FIRST FLOOR PLAN

SECOND FLOOR PLAN

Floor plans of Alfred Jones' residence, Lancaster, Pa. Picture of Alfred Jones' house is shown on page 33 of the "Style Sheet" of this issue

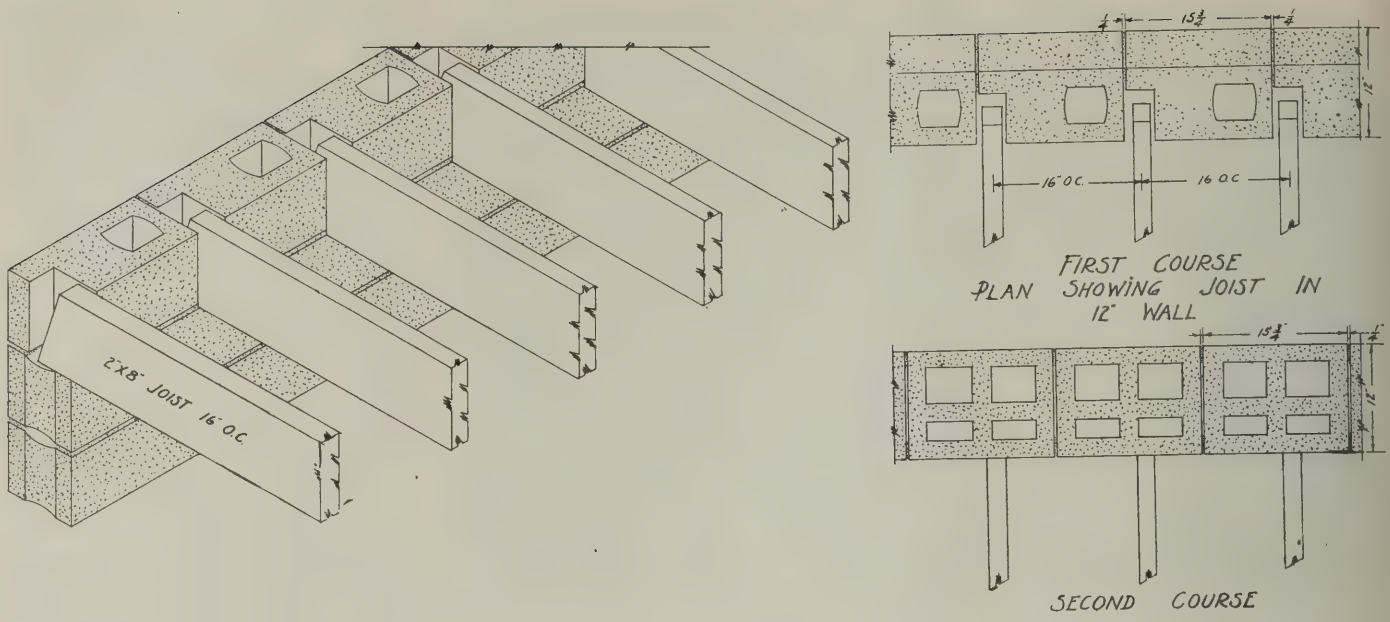


Fig. 4—Detail of floor construction

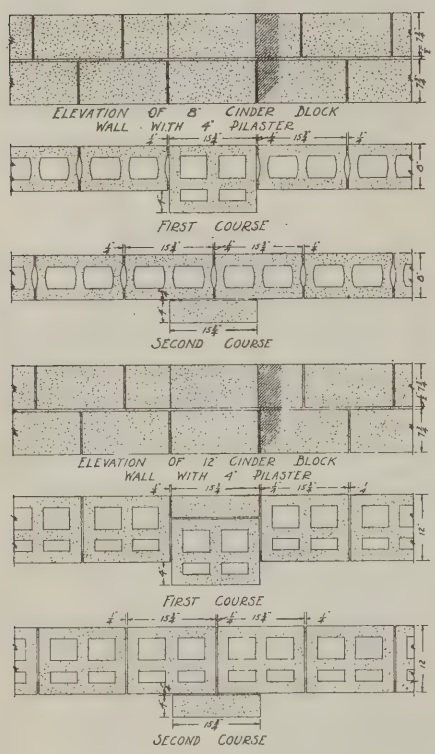

ELEVATION OF 8" CINDER BLOCK WALL WITH 4" PILASTER
FIRST COURSE
SECOND COURSE
ELEVATION OF 12" CINDER BLOCK WALL WITH 4" PILASTER
FIRST COURSE
SECOND COURSE

Fig. 3—Plan detail of wall construction

ager of the Armstrong Cork Co., of which both photograph (see "Style Sheet") and floor plans are shown, occupies a pleasant site in the new suburban district of the city and has already become one of the show places of that vicinity. The architect is Henry Boettcher of Lancaster, who has also done many splendid concrete residences as well as an imposing array of industrial buildings in which concrete masonry has been used. The type of architecture employed was Mr. Jones' personal choice, and both owner and architect are

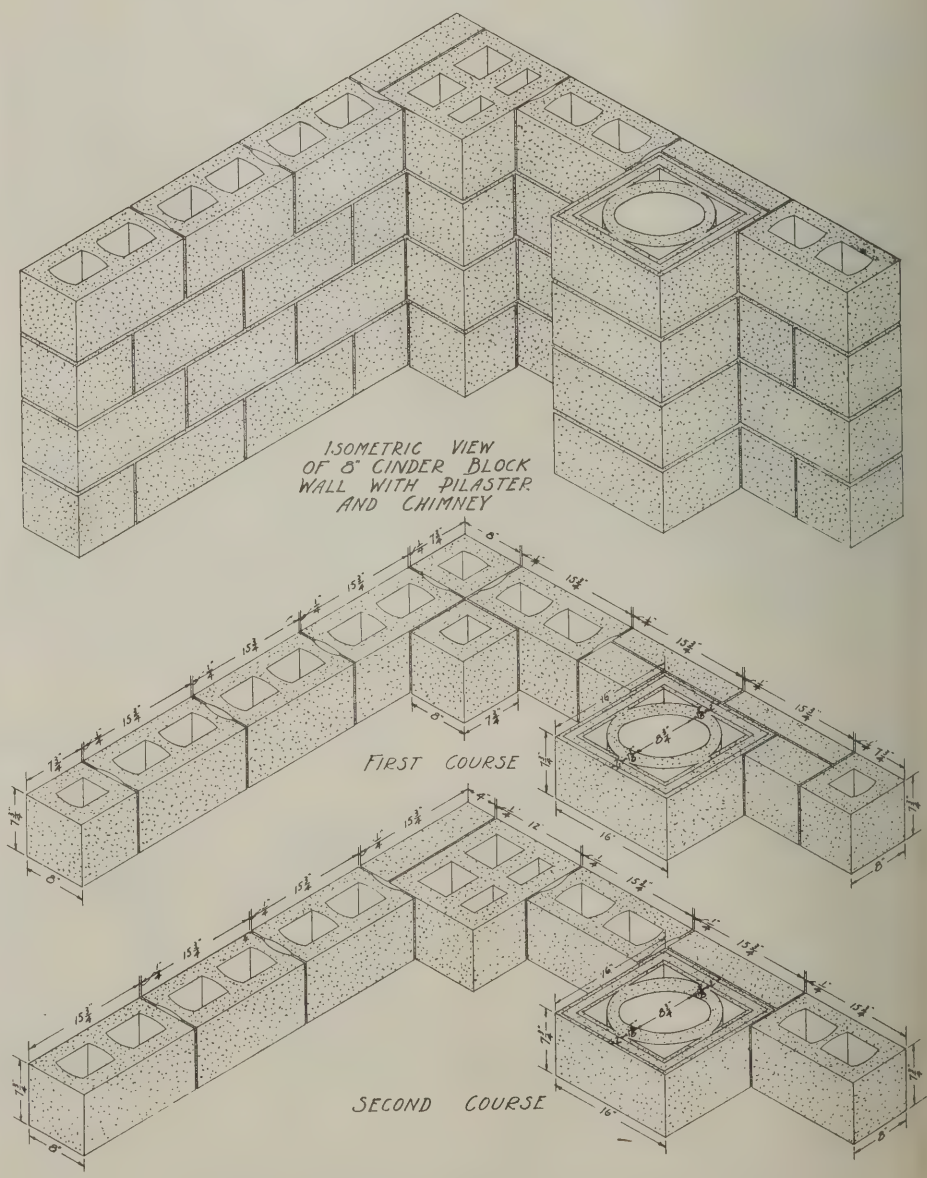


Fig. 5—Wall and chimney construction

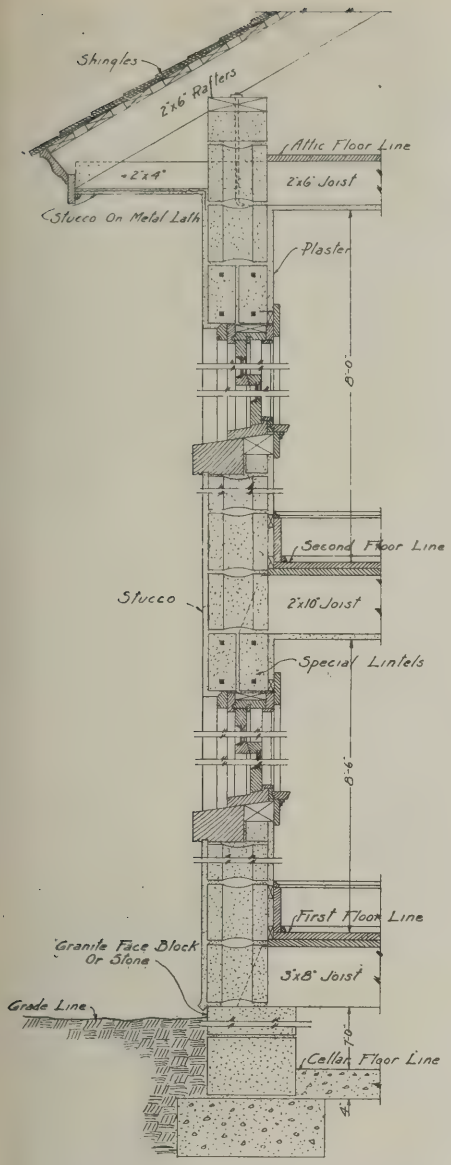


Fig. 1—Detail of 8-in. wall used in Lancaster, Pa.

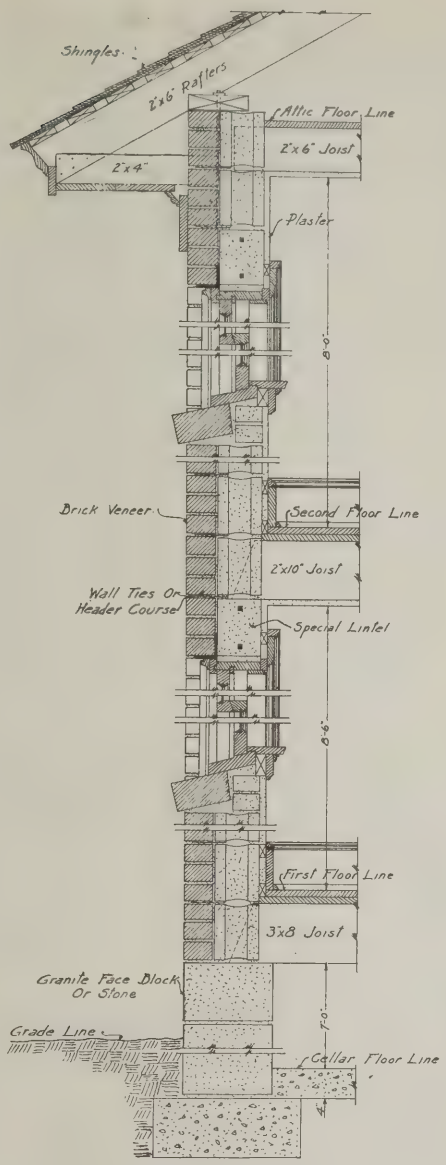


Fig. 2—Detail of wall with brick veneer

pleased with the interpretation of their design in concrete masonry. The thatched roof effect is a pleasing feature. Herman Wohlsen of Lancaster was the contractor.

Other local contractors have found the material well adapted to their uses and no small factor in the success of the Lancaster Concrete Tile Co. has been the determination to give good service. Service, which in this case means plenty of stock plus quick delivery, has made it possible for contractors to save time and labor by using this local material which, during 1922, was freely available, except at the peak of the building season. The Lancaster Concrete Tile Co. is planning to extend its business by acquiring larger facilities, enabling it to maintain stocks amply sufficient to meet all emergencies. In the second year of its existence, this company made and sold over a million concrete block, counting all shapes and sizes. These were equivalent in volume to 833,000 8x8x16-in. block, or approximately 11,662,000 common brick.

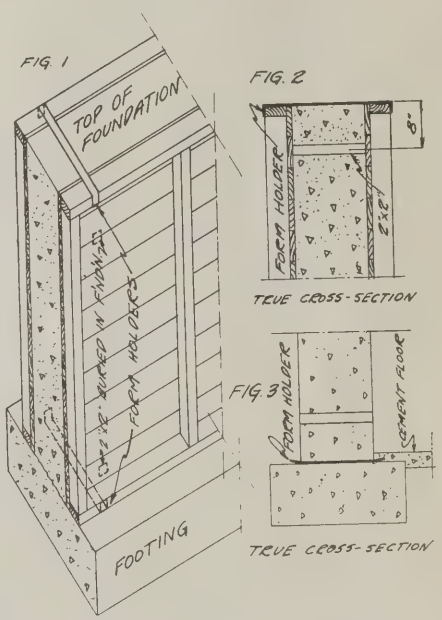
J. Edwin Rutter is in charge of the concern as general manager, being assisted by a capable sales, manufacturing, architectural and engineering staff.

A Method for Holding Foundation Forms

IN setting concrete forms in the ordinary way where unit forms are used, a great deal of labor is consumed in wiring the forms so that they will hold together. Wiring forms is not only costly but it is also difficult, especially where the excavation is deep. When using wire to hold the forms, it is necessary to make holes in the forms in order to pass the wires through. Driving holes in the forms soon splits them and it is only a short time before they must be repaired or replaced.

A system which overcomes the difficulty and costliness of wiring is shown in the accompanying illustration in Fig. 1. This particular "kink" is the use of metal holders made of 1½-in. x 3/32-in. or 1½-in- x ⅛-in. iron, bent to fit over the forms as shown. No nailing, clamping or wiring is necessary. Merely set the holders, place the wood spreaders, and pour the concrete.

Under this system the footings are laid first. The forms are placed upon the footings, and the holders, spaced about four ft. on centers, are slipped under the forms with the lips of the holders outside the 2-in. x 4-in. of the form frame. Next a piece of 2-in x 2-in., cut to a length equal to the width of the foundation is wedged in the form a short distance above the holder, thus forcing the 2-in. x 4-in. of the form frame against the lips of the holder and holding the form tight. The same is done at the top. (Fig. 2.)

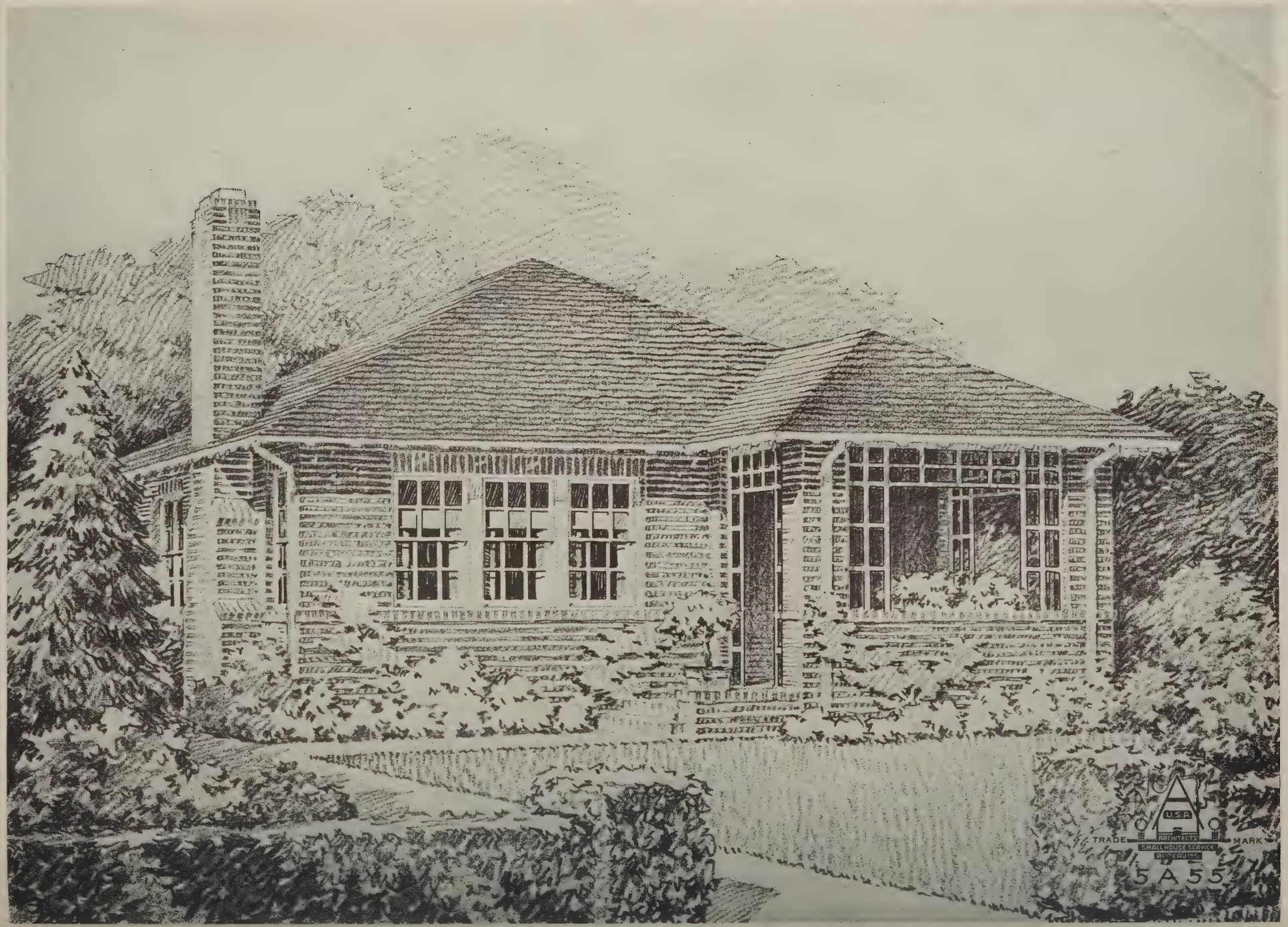


Simple method of holding forms for concrete foundations

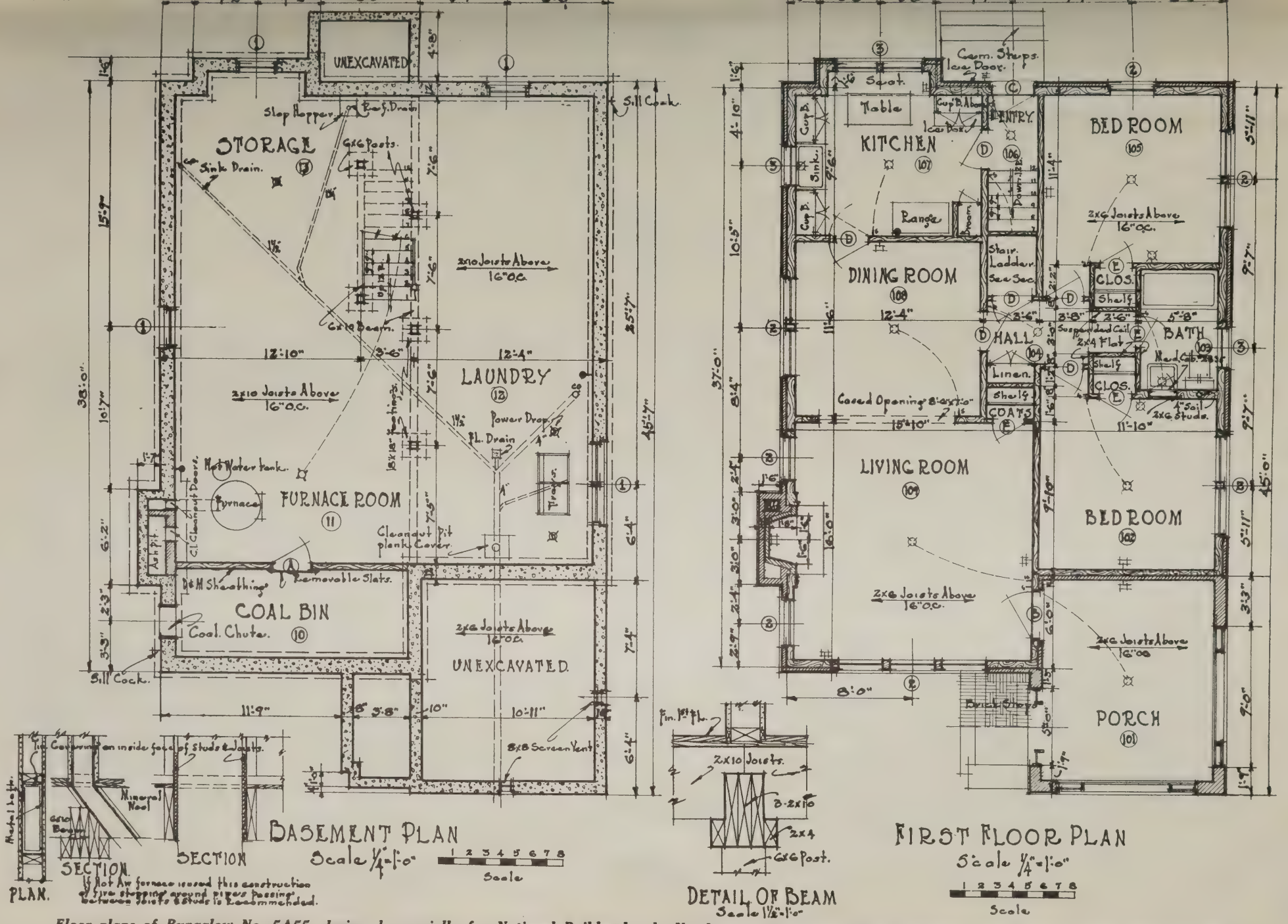
After the concrete is poured the top holders are lifted off with a pick or a bar, the lips of the lower holders are bent outward and the form is removed. The lower holders are left in the concrete. The lip of the lower holder which projects inside the foundation wall will be covered up by the concrete basement floor and the lip which projects outside the foundation will be buried in the fill. The wood spreaders are left in the foundation the same as when the forms are wired.

This is a quick, efficient, and labor-saving method of setting forms and is sure to make a saving in foundation costs. The holders are very inexpensive and can be made by a laborer from iron of stock dimensions to be found in any blacksmith shop.

[Here is an opportunity for contractors and builders to send in kinks that they have devised for form work. Five dollars each for good ones!—The Editor.]



Design No. 5A55 by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc., especially for National Builder. Full



Floor plans of Bungalow No. 5A55, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc. Copyrighted by National Builder and The Architects' Small House Service Bureau

Brick Veneer Bungalow No. 5A55

THE bungalow pictured here has the substantial, yet cozy, exterior appearance, and an arrangement of rooms that will appeal to a great majority of people looking for a five-room bungalow.

It is also well planned, well proportioned and architecturally correct in detail. The porch, with its square opening and lattice work, show that beauty can be wrought into the porch in other ways than through expensive brackets and fancy columns.

It is of brick veneer on wood frame; has five rooms, bath, breakfast nook, basement and open porch. A 40-ft. lot will carry this bungalow. The outside overall dimensions are 28 ft. 6 in. wide by 45 ft. deep, including the porch. Inside dimensions of the porch are 11 ft. x 13 ft.

As designed, the bungalow should face south or east. Reversed plans for north or west frontage supplied without extra charge.

If the family income needs to be helped out by renting a room, the front bedroom could open directly onto the front porch.

The living room has a fireplace, and the wide cased opening between living room and dining room throw both rooms together into practically one large sunny room. This is a popular arrangement, as it increases the apparent space in a small bungalow. A clothes closet opens into the living room.

In the kitchen the sink is under a window with work space and cabinets on either side. The niche provides the popular breakfast alcove. The icebox can have outside icing.

The bedroom hall has been made as tiny as possible, so as not to take any footage from other rooms. There is a linen closet in this hall, and the stair ladder to the attic storage space. The bedrooms each have a good closet, and the bath is placed where it is most convenient.

Ample storage and a laundry room in addition to the heater space are provided in the basement.

The regular price of this plan is $25. Half price to NATIONAL BUILDER subscribers (add 50 cents for postage and packing).

EXCAVATING—294 cu. yd.

BACKFILL—65 cu. yd.

FOUNDATION—If 12" concrete, 53 cu. yd. gravel, 214 sax cement; if 9" concrete, 42 cu. yd. gravel, 170 sax cement; if 12" tile, 23700 CBM tile, 18 cu. yd. mortar; if 9" tile, 17000 CBM tile, 14 cu. yd. mortar.

FACE BRICK, VENEERS—9240 face brick; 7 cu. yd. mortar; 540 lb. mortar color.

CHIMNEY—1900 common brick; 540 face brick; 100 fire brick; 20 sq. ft. hearth tile; 120 inside face brick; 40 lin. ft. flue tile; 20 lb. fire clay; 3 cu. yd. mortar; 1 cast-iron ash dump; 1 throat and damper; 1 angle 4x3x5/16-4'0"; 2 cleanout doors 8x12; 1—8" adjustable thimble; 2—6" adjustable thimbles; 7 yd. metal lath.

LATH—9 sq. yd. metal lath over boiler; 7250 wood lath.

PLASTER—9 sq. yd. plaster on metal lath; 512 sq. yd. plaster on wood lath; 14 sq. yd. Keene's cement.

TILE FLOORS—35 sq. ft. ceramic tile; 24 lin. ft. cove base.

CEMENT FLOOR—6 cu. yd. gravel; 5 cu. yd. sand; 66 sax cement; 14 lin. ft. cement steps; 5 cement spatter blocks.

LUMBER—5—6x6-7 posts; 1—6x10-9 girder; 6—2x10-16 girders; 4—2x4-16 girder ribbons; 3—2x10-14 stair horses; 4 ft. 2" plank cleanout cover; 3—2x4-16 basement partition plates; 9—2x4-7basement partition studs; 160 ft. D & M basement partition sheathing; 12—2x6-12 first-floor joists; 2—2x6-14 porch joist headers; 25—2x10-12 first-floor joists; 29—2x10-16 first-floor joists; 5—2x10-16 box sills; 2—2x10-16 doubles under partitions; 2—2x10-12 doubles under partitions; 4—2x10-14 headers; 200 lin. ft. 1x4 bridg'g; 1300 ft. com. bds. first-floor subfloor; 1500 ft. 13/16x1½ first floor finish floor; 390 lin. ft. 2x4 first-floor partition plates; 124—2x4-9 first-floor partition studs; 8—2x4-14 opening doubles; 4—2x4-16 opening headers; 1100 lin. ft. ground; 210 ft. ⅞ flooring for porch; 200 ft. ⅝ ceiling for porch; 2—2x10-8 porch girders; 2—2x10-14 porch girders; 2—2x10-12 porch girders; 12—2x6-12 porch ceiling joists; 25—2x6-12 first-floor ceiling joists; 29—2x6-16 first-floor ceiling joists; 1300 ft. D & M attic floor; 2—2x6-14 ceiling joist headers; 388 lin. ft. 2x4 outside wall studs; 120—2x4-9 outside wall studs; 12—2x4-14 opening doubles; 8—2x4-16 opening h'drs; 1400 ft. shiplap outside wall sheathing; 4—2x6-22 hip rafters; 2—2x6-14 hip rafters; 1—2x6-14 valley rafters; 4—2x4-6 dormer rafters; 62—2x4-18 rafters; 19—2x4-9 rafters; 1—1x6-18 ridge rafter; 2090 ft. com. bds. roof sheathing; 15 ¼ M shingles; 300 ft. ⅝ ceiling plancier; 25—2x4-12 scaffolds, etc.; 4—2x4-14 scaffolds, etc.; 3—2x4-16 scaffolds, etc.; 4—2x8-16 scaffolds, etc.; 4—2x10-16 scaffolds, etc.; 2—2x12-16 scaffolds, etc.

MILLWORK—Frames: 3 cellar 8x10-3L-1⅜; 1 twin 8x10-3L-1⅜; 3 single 10x12-12L-1⅜ (ck rl); 3 mul. 10x12-12L-1⅜ (ck rl); 1 triple 10x12-12L-1⅜ (ck rl); 2 single 12x8-8L-1⅜ (ck rl); 1 mul. 12x8-8L-1⅜ (ck rl); 1 sash 8x12-3L-1⅜. **Windows:** 5 cellar sash 8x10-3L-1⅜; 12 windows 10x12-12L-1⅜; 4 windows 12x8-8L-1⅜; 1 sash 8x12-3L-1⅜. **Storm Sash:** 5—8x10-3L-1⅜; 12—10x12-12L-1⅜; 4—12x8-8L-1⅜; 1—8x12-3L-1 ⅛; **Screens:** 5—8x10-3L-1⅜; 12—10x12-12L-1⅜; 4—12x8-8L-1⅜; 1—8x12-3L-1⅜. **Porch Frames:** 2—9'0"x 6'0"; 1—5'0"x9'0". **Outside Door Frames:** 1 dr. fr. 3'0"x7'0"-1¾; 1 dr. fr. 2'8"x7'0"-1¾; 1 icing dr. fr. **Outside Doors:** 1—3'0"x7'0"-1¾ (No. 108 Curtis); 1—2'8"x7'0"-1¾; 1 icing door. **Storm Doors:** 1—3'0"x7'0"-1⅛; 1—2'8"x7'0"-1⅛. **Screen Doors:** 1—3'0"x7'0"-1⅛; 1—2'8"x7'0"-1⅛. **Outside Millwork:** 170 lin. ft. cornice; 84 rafter tails; 2 lattice frames 9'0"x6'0"; 1 lattice frame 5'0"x 9'0"; 60 lin. ft. porch ceiling cove. **Interior Doors:** 1—2'6"x6'8"-1⅜ (5P); 6—2'6"x7'0"-1⅜ (1102); 4—2'0"x7'0"-1⅜ (1102). **Jambs:** 1—2'6"x6'8"; 6—2'6"x7'0"; 4—2'0"x7'0"; 1—8'6"x7'0". **Interior Trim:** 3 sides single trim 8x 10-3L; 1 s. twin 8x10-3L; 3 s. single 10x12-12L; 3 s. mul. 10x12-12L; 1 s. triple 10x12-12L; 2 s. single 12x8-8L; 1 s. mul. 12x8-8L; 1 s. sash 8x12-3L; 1 s. door trim 3'0"x7'0"; 1 s. door trim 2'8"x7'0"; 1 s. icing door trim; 2 s. door trim 2'6"x6'8"; 12 s. door trim 2'6"x7'0"; 8 s. door trim 2'0"x7'0"; 2 s. opening trim 8'6"x7'0"; 1 flight basement stairs; 1 ladder to attic; 1 medicine cabinet (2835); 1 utility door; 1 utility door jamb; 1 side trim for utility door; 1 scuttle door; 1 scuttle door jamb; 1 scuttle door side trim; 1 linen closet; 1 broom closet; 1—3'0" kitchen cupboard; 1—6'6" kitchen seat; 1—4'0" kitchen table; 2—3'0" kitchen cupboards; 1—mantel shelf; 12 lin. ft. closet shelving; 12 lin. ft. closet hook strip; 10 lin. ft. closet clothes pole; 390 lin. ft. base; 390 lin. ft. base shoe; 390 lin. ft. base molding; 196 lin. ft. picture molding; 108 lin. ft. ceiling cove; 26 lin. ft. band molding; 6 lin. ft. threshold; 2 drainboards. **Note:** If living and dining room trim is changed, it will affect the following included above: 1 door 3'0"x7'0"-1¾ (Curtis No. 108); 1 door trim 3'0"x7'0"; 2 doors 2'6"x7'0"-1⅜ (1102); 2 jambs 2'6"x7'0"; 2 side trim 2'6"x7'0"; 1 door 2'0"x7'0"-1⅜ (1102); 1 side trim 2'0"x7'0"; 1 jamb 8'6"x7'0"; 2 side trim 8'6"x7'0"; 2 sides single trim 10x12-12L; 1 side mul. trim 10x12-12L; 1 side triple trim 10x12-12L; 1 mantel shelf; 108 lin. ft. ceiling cove; 100 lin. ft. base; 100 lin. ft. base shoe; 100 lin. ft. base molding; 110 lin. ft. picture molding; 568 ft. flooring 13/16x1½.

TINWORK—2—8x8 screened vents; 1 saddle; 8 lin. ft. chimney flashing; 92 lin. ft. hip roll; 12 lin. ft. valley tin; 20 lin. ft. dormer flashing; 18 lin. ft. ridge roll; 3 finals; 160 lin. ft. box gutter; 5 nipples; 5 strainers; 5 offsets; 5 elbows; 5 shut-offs; 5 outside miters; 1 inside miter 50 lin. ft. conductor.

STRUCTURAL STEEL—(3x3x¼ angle lintels); 3—3'6" basement; 1—5'6" basement; 3—4'0" first-floor wds.; 3—7'0" first-floor wds.; 1—10'6" first-floor wds.; 2—3'4" first-floor wds.; 1—6'3" first-floor wds.; 2—4'0" first-floor doors; 1—2'0" icing door; 1—2'6" coal chute.

REINFORCING STEEL—8—⅜ round rods, 6'0"; 4—⅜ round rods, 5'0".

HARDWARE—5 cellar sash sets; 16 sash locks; 16 sash lifts; 22 storm sash sets; 22 screen sets; 1 front door set with butts; 1 rear door set with butts; 1 icing door set with butts; 2 storm door sets; 2 screen door sets; 1 floor hinge; 2 push plates; 10 inside door sets with butts; 13 door bumpers; 2 dozen clothes hooks; 470 lb. sash weights; 4 hanks sash cord; 1250 lb. assorted nails; 6 lb. assorted brads; 1 coal chute; (medicine cabinet: 1 pr. ornamental butts; 1 cupboard turn); 4 friction stays, utility door; 1 pr. hinges for scuttle door; (broom closet: 1 pr. ornamental butts; 1 cupboard turn); (2—3'0" cabinets: 10 pr. ornamental butts; 6 cupboard turns; 4 elbow catches; 1 bin pull; 1 set castors; 4 drawer pulls); 1 pr. hinges for seat; (cabinet over ice box: 2 pr. ornamental butts; 1 cupboard turn; 1 elbow catch); (linen closet: 4 pr. ornamental butts; 2 cupboard turns; 2 elbow catches).

EXTERIOR PAINTING—3 gal. trim paint; 1 gal. boiled oil; 45 gal. shingle stain; ½ gal. porch floor paint; 1 gal. screen paint; 1 gal. sash paint; 1 gal. Japan; 1 gal. turpentine; 5 lb. putty; 4 doz. sheets sandpaper.

INTERIOR PAINTING—10 gal. white paint; 6 gal. enamel; 4½ gal. filler stain; 3 gal. shellac; 10 gal. interior varnish; 3 gal. floor shellac; 6 gal. floor varnish; 2 gal. oil; 1 gal. Japan; 1 gal. turpentine; 1 gal. alcohol; 3 lb. steel wool; 2 doz. sheets assorted sandpaper; 3 lb. putty.

WEATHER STRIPPING—5 cellar sash 8x10-3L; 12 windows 10x12-12L; 4 windows 12x8-8L; 1 door 3'0"x7'0"; 1 door 2'8"x7'0".

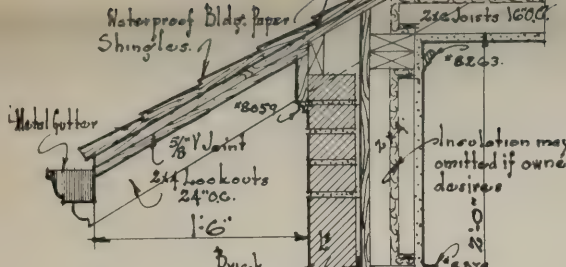
CAULKING—4 sash frames; 1 twin sash frame; 5 single wd. frames; 4 mul. wd. frames; 1 triple wd. frame; 1 coal chute; 2 door frames; 1 icing door frame; 23 lin. ft. chimney.

INSULATION—2 rolls felt for floors; 3 rolls felt for outside walls; 4 rolls felt for roof; 1000 ft. flaxlinum or equal for OS walls; 1060 ft. flaxlinum or equal for ceiling.

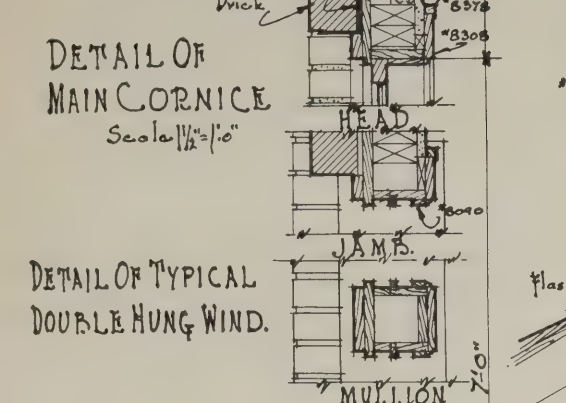
Chimney Will Not Draw in Wind from Northwest

116. E. G. M., Hudson, N. H., writes: "I have a sticker for some one—a chimney which will not draw when the wind is from the northwest. I have built the rear chimney 18 ft. above the roof, or to the level of the one on the main house. There is not a tree within a mile on the north side as high as the house. The chimney is straight, 18 in. square outside; one 6-in. stovepipe connected."

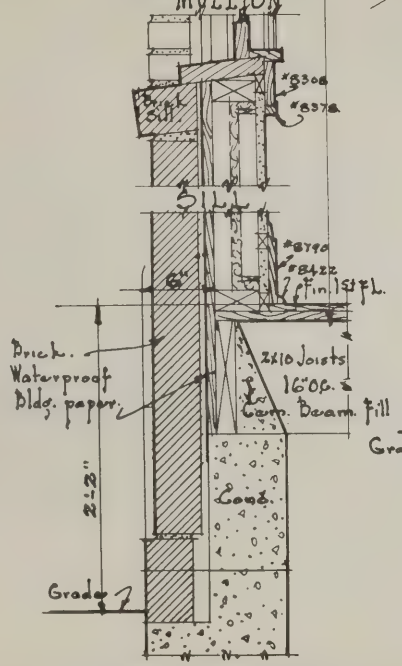
Answer.—Evidently the wind ricochets against the house and a dead pocket is formed above the chimney. Experiment with some form of windbreak or deflector at the point of wind-deflection might overcome the difficulty. Have any of our readers ideas or experiences that would help E. G. M.?



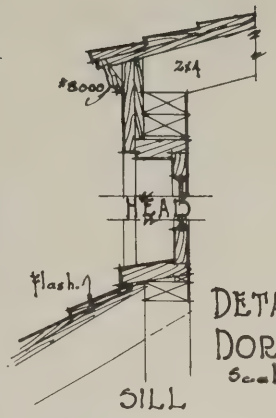
DETAIL OF MAIN CORNICE
Scale 1½"=1'-0"



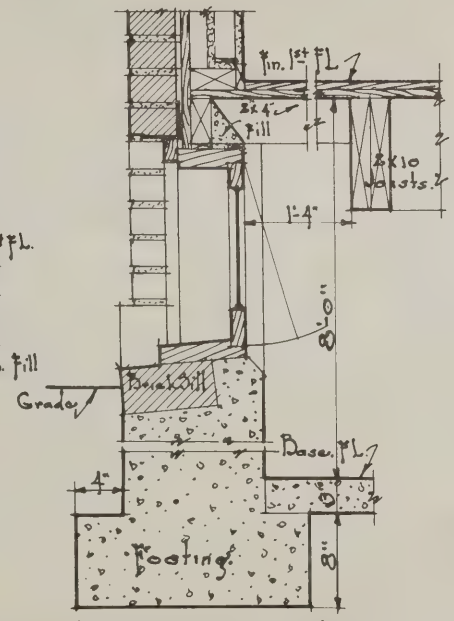
DETAIL OF TYPICAL DOUBLE HUNG WIND.



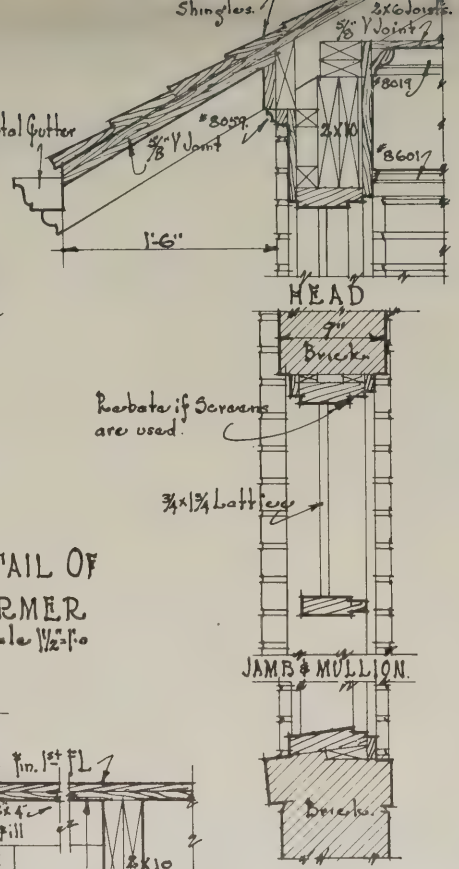
TYPICAL DETAIL OF WALL
Scale 1½"=1'-0"



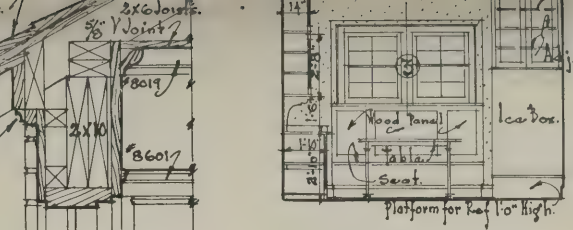
DETAIL OF DORMER
Scale 1½"=1'-0"



TYPICAL BASEMENT WIND.
Scale 1½"=1'-0"

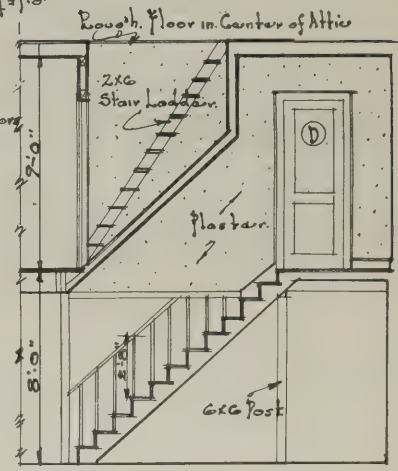


SILL
DETAIL OF OPEN PORCH
Scale 1½"=1'-0"

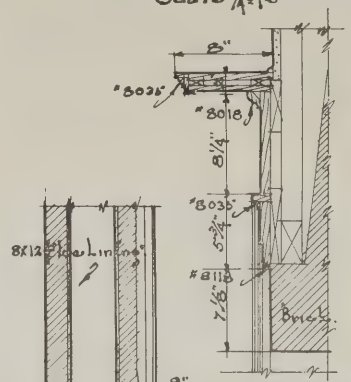


KITCHEN TOWARD REAR.
KITCHEN TOWARD SINK.
ELEV. BROOM CLOS.

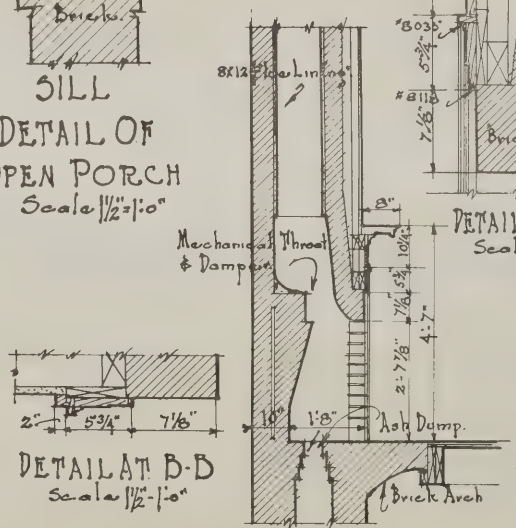
ELEVATION OF BATH R'M
ELEVATION OF LINEN CASE
Scale ¼"=1'-0"



SECTION THRU STAIR
Scale ¼"=1'-0"

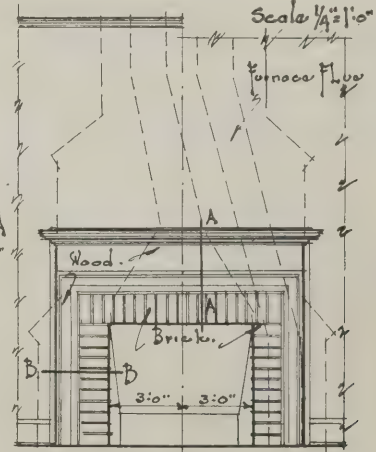


DETAIL AT A-A
Scale 1½"=1'-0"



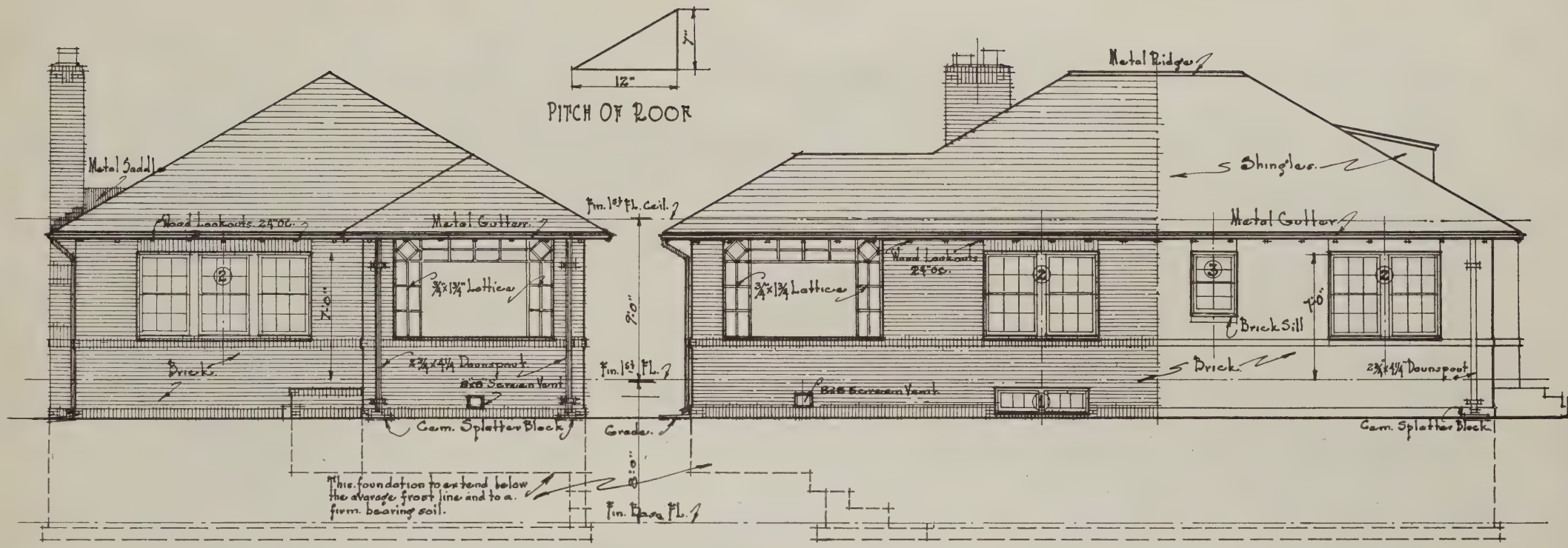
SECTION

DETAIL AT B-B
Scale 1½"=1'-0"



ELEVATION OF FIREPLACE
Scale ½"=1'-0"

Structural details of Bungalow No. 5A55. Copyrighted by National Builder and The Architects' Small House Service Bureau



FRONT ELEVATION

Scale 1/4"-1'-0"

1 2 3 4 5 6 7 8

Scale

Scale 1/4"=1'-0"

SIDE ELEVATION

Scale 1/4"-1'-0"

1 2 3 4 5 6 7 8

Scale

SCHEDULE OF WINDOWS.

QUANTY	TYPE	DESCRIPTION	No. OF LIGHTS	SIZE OF GLASS	SIZE OF OPNG FOR SASH	THICKNS SASH	FRAME
5	1	BASEMENT	3	8x10	2'-4"x 1'-2"	1 3/8"	SEE DETAIL
12	2	DOUBLE HUNG	12	10x12	2'-10 5/8"x 4'-6"	1 3/8	"
4	3	" "	8	12x8	2'-5"x 3'-1"	1 3/8"	"
1	4	DORMER.	3	8x12	2'-4"x 1'-5"	1 3/8"	"

All masonry openings to have 3"x3"x1/4" L for Lintels.

SCHEDULE OF DOORS

QUANTY	TYPE	SIZE	DESCRIPTION	REMARKS
1	A	2'-6"x6'-8"x1 3/8"	BASEMENT	5 PANEL
1	B	3'-0"x7'-0"x1 3/4"	CURTIS #108	FRONT
1	C	2'-6"x7'-0"x1 3/4"	SEE ELEV.	REAR.
6	D	2'-6"x7'-0"x1 3/8"	UNIV. #1102	INTERIOR
4	E	2'-0"x7'-0"x1 3/8"	" "	"

Front and side elevations of Bungalow No. 5A55, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc. Copyrighted by National Builder and The Architects' Small House Service Bureau

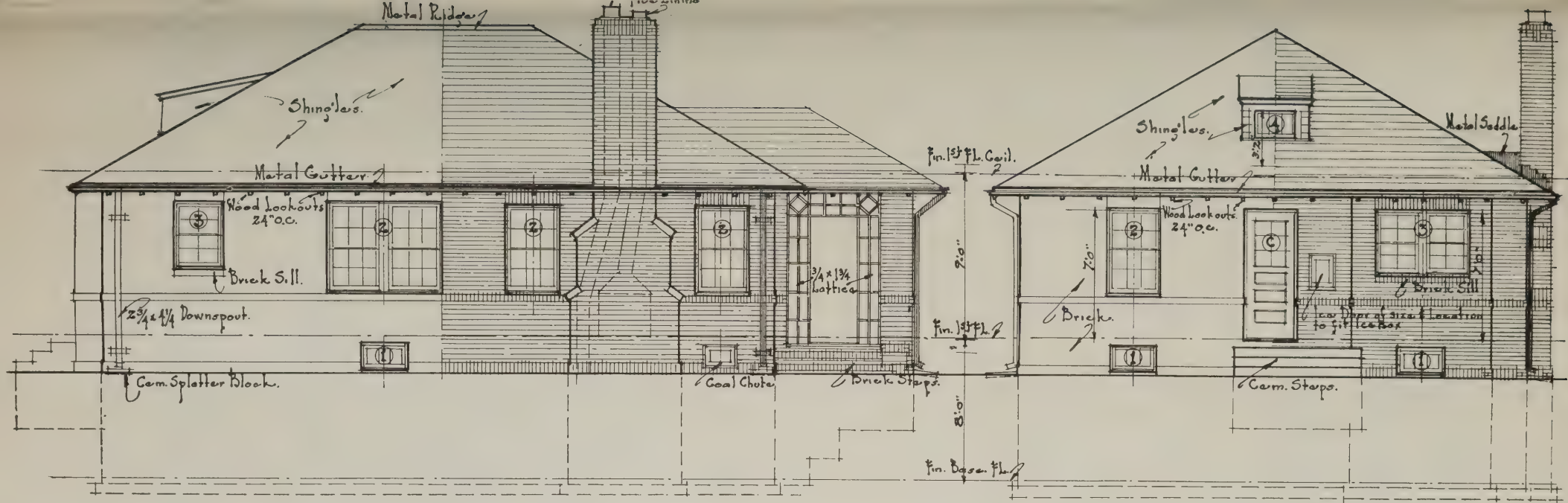
Dimensions are taken to outside of foundation walls, to outside of studs on exterior walls and center of studs for partitions.

Foundation walls shown concrete may be stone, brick, block, or load-bearing hollow tile.

Where building ordinances permit, foundation walls may be 9 in. thick (with 20x9-in. footings), except in case of stone, which shall be 18 in. thick.

Stock numbers refer to moldings in Universal Millwork Design Book No. 20. In case these moldings cannot be procured, others of similar design and size may be substituted.

Provide 1⅛-in. screen and storm sash for all exterior openings except ice door unless otherwise noted. Bottom rail of storm sash to have vent.



SIDE ELEVATION

Scale ¼"=1'-0"

1 2 3 4 5 6 7 8

Scale

REAR ELEVATION

Scale ¼"=1'-0"

1 2 3 4 5 6 7 8

Scale

Side and rear elevations of Bungalow No. 5A55, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc. Copyrighted by National Builder and The Architects' Small House Service Bureau

Prize Offer!

NATIONAL BUILDER has made a contract with the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc., for a number of complete designs and plans of houses for use of National Builder subscribers. Our object in making this contract was to place before our readers what is generally accepted as the last word in small-house architecture.

The Architects' Small House Service Bureau is growing by leaps and bounds. It is selling its services to thousands of house owners, and prospective house owners, throughout the land. Columns upon columns in the daily newspapers and in popular magazines of national circulation are telling the story of the bureau and its work to millions of readers every week.

Are you taking advantage of what National Builder is offering to you, Mr. Builder, in this and every issue? If you are, sit down and write us about it. For the best story, or letter, of how our readers are using these plans and this unique architectural service we are going to give a prize of $250. For the next best story a prize of $125, and for the next three, prizes of $50 each—a total of $525 in cash prizes—on or before August 1, 1923.

You don't have to be a writer to win one of these prizes. All you have to be is a builder or contractor. We want facts.—The Editor.

The chart below shows the symbols used on all the plans of The Architects' Small House Service Bureau of the United States, Inc.

MATERIALS		ELECTRIC WIRING SYMBOLS			
CONCRETE		CEILING OUTLET		3 WAY SWITCH	
BRICK		DROP CORD		GAS OUTLET	
WOOD		BRACKET		PUSH BUTTON	
PLASTER		BASE PLUG		BELL OUTLET	
TILE		SWITCH		BUZZER	

An Up-to-the-Minute Automobile Filling Station

Complete Detail Plans of Filling Station for the Barkhausen Oil Co., Green Bay, Wis., Designed and Built by the Ludolf M. Hansen Co., Contractors

IT seems to be quite generally accepted that a filling station for the sale of gasoline and oils to automobile drivers must be conspicuous. It must be an advertisement in itself. Attempts to get a conspicuous, distinctive structure that will attract attention are numerous in every city. More often they are conspicuous for contempt of architectural design than because of it.

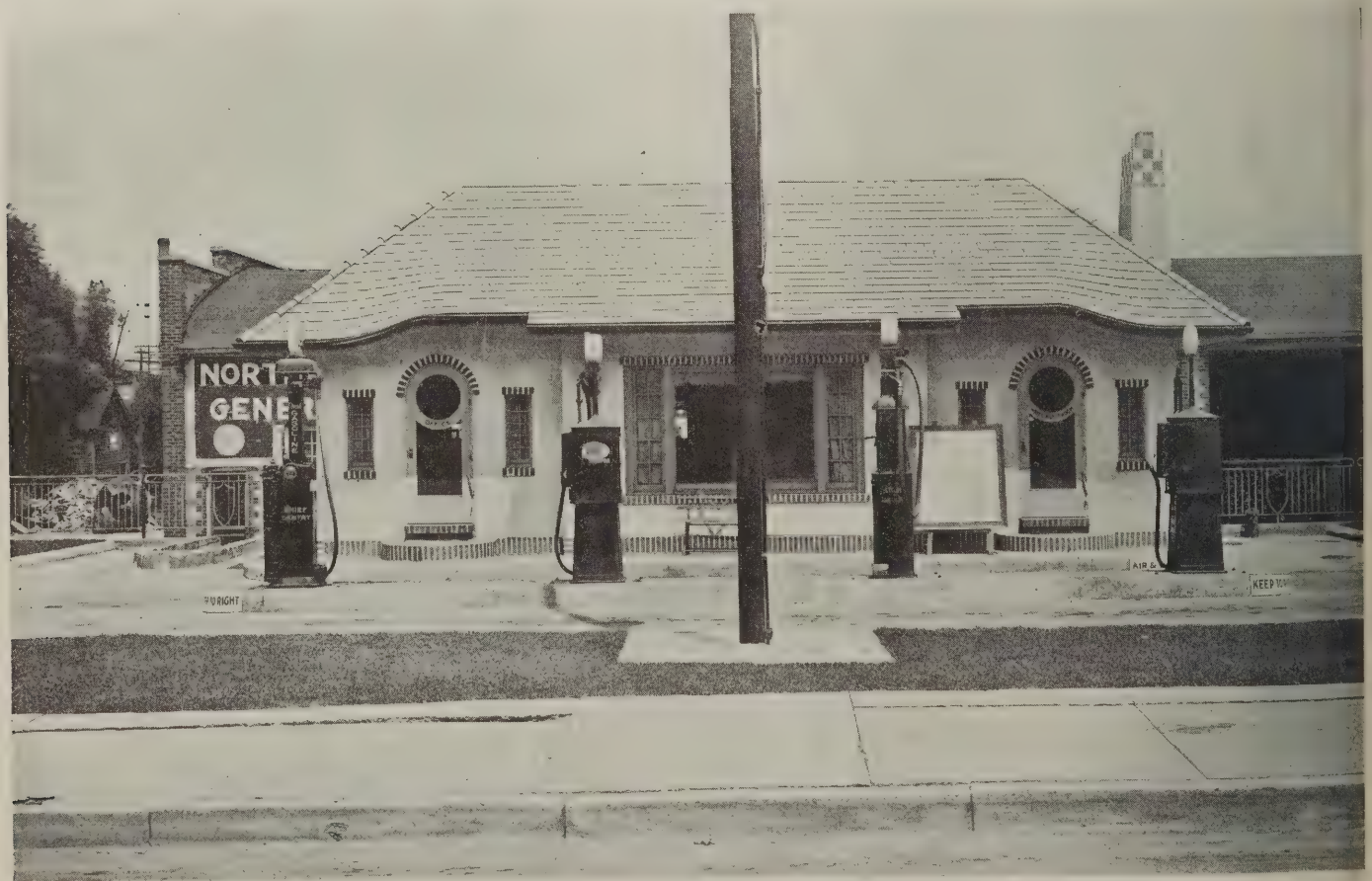
The filling station herewith seems to be an exception to the general run because it is conspicuous and distinctive; and at the same time pleasing. The view below does not do full justice to the building because the coloring—white stucco with red brick trim, and vari-colored asbestos shingles—is not reproduced. Moreover, it is reputed to be a particularly well designed structure from an engineering or technical point of view.

A lengthy description is not necessary since the following pages contain reproduction of the complete set of working drawings. Particular attention is called to the mechanical equipment and layout, which are unusually complete and carefully detailed, especially the piping details connecting the underground gasoline tanks with the pumps.

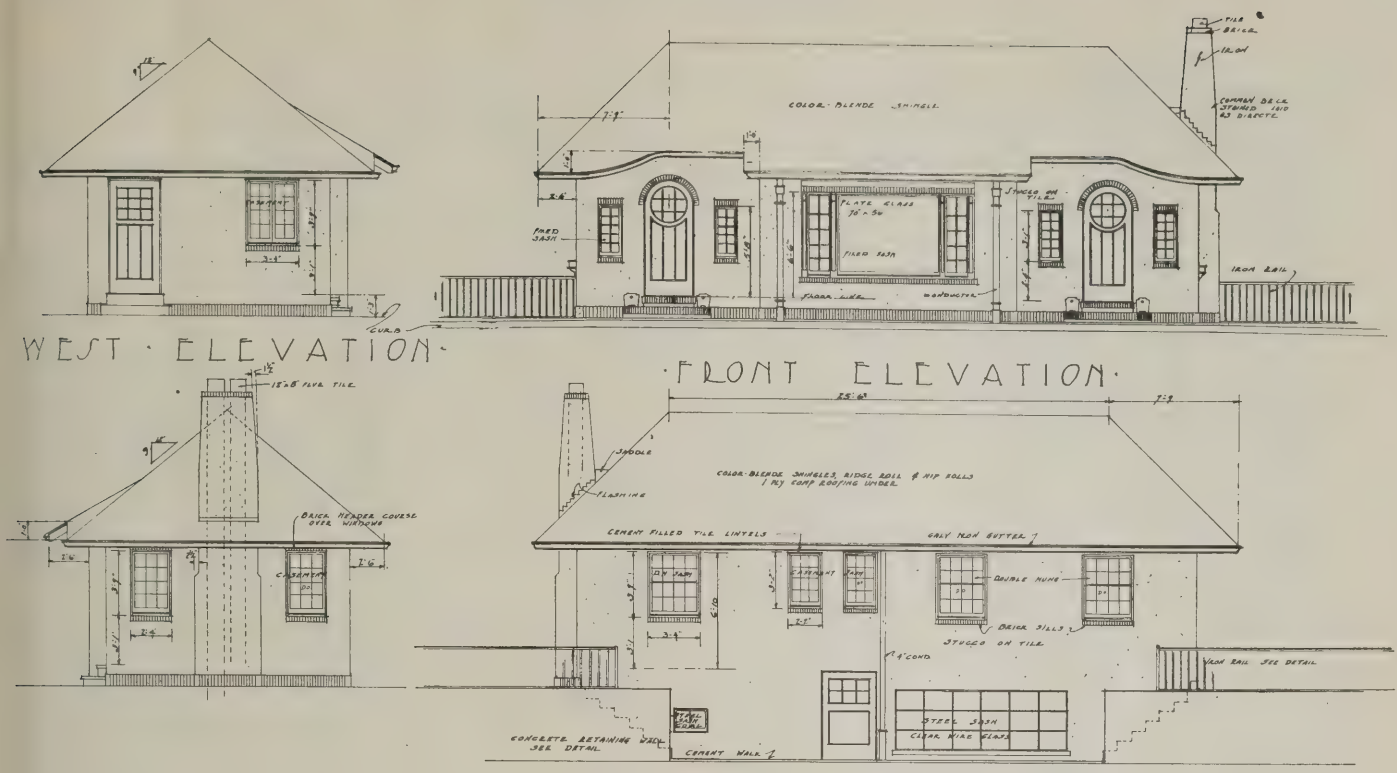
These plans also illustrate the attention that must be given to the layout of the entire plot of ground so as to utilize the property devoted to the business to the best advantage. These are, probably, in this respect, the most complete plans ever published.

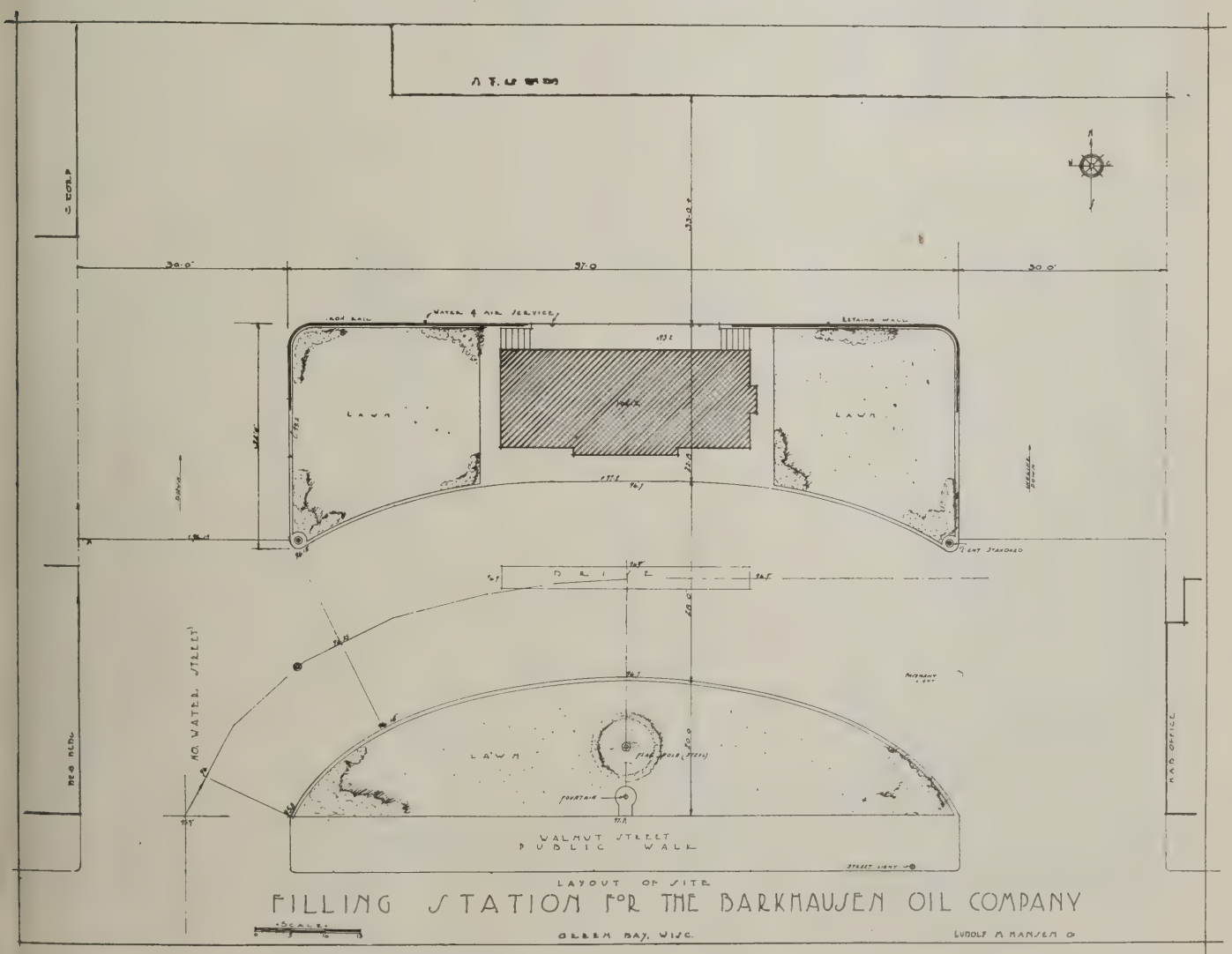
The designer and contractor for this building is the Ludolph M. Hansen Co., Grene Bay, Wis., about which we shall have more to say in a later issue. This company designs and builds structures of every type from houses to the most complicated industrial plant. The president and organizer of this company, Ludolf M. Hansen, has been a successful builder and contractor for nearly 20 years; and his specialty is complete service from design to finish of the building.

The architect of the company, who designed the filling station illustrated here, and many other equally notable and distinctive buildings, is Clarence Jahn.

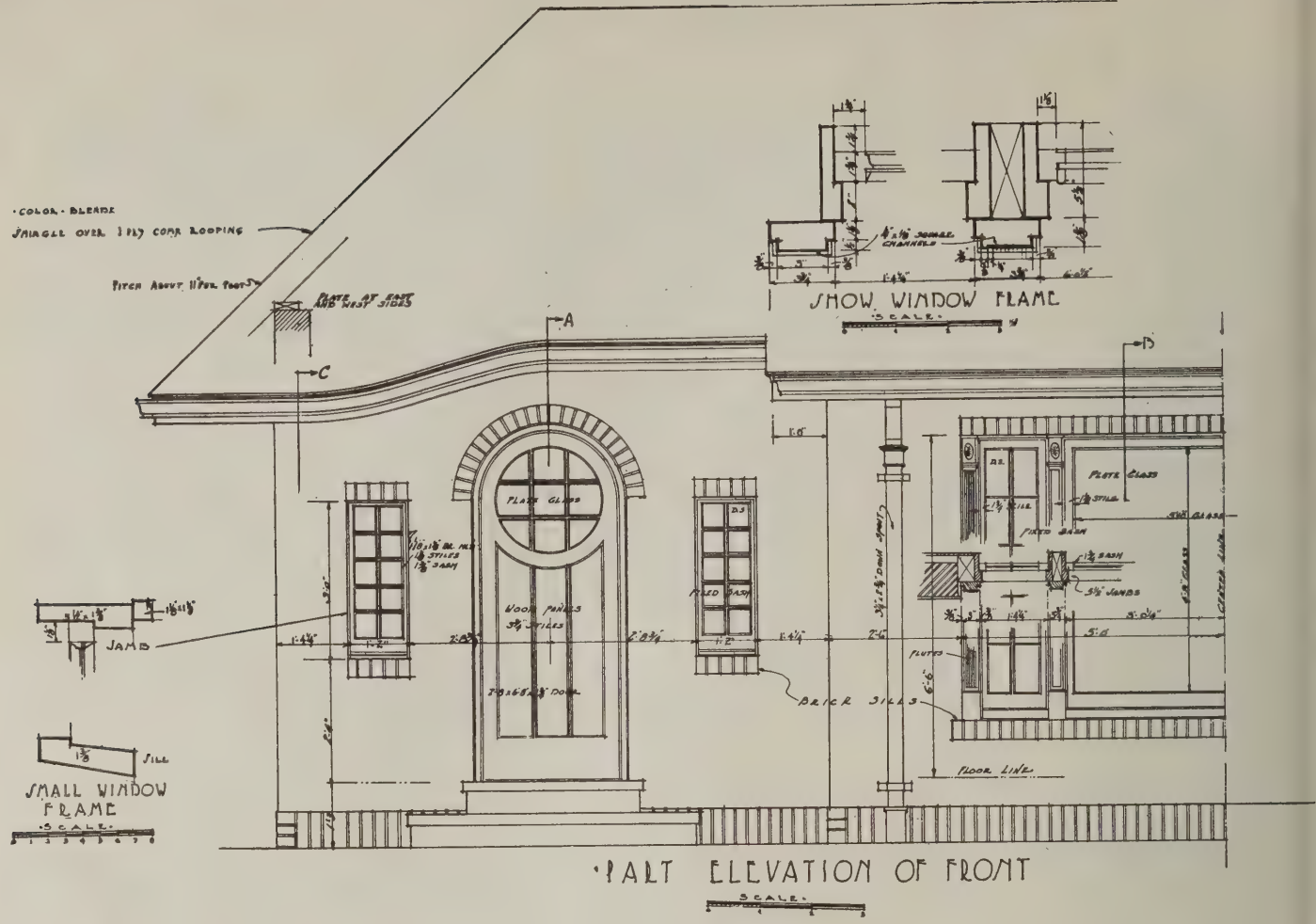


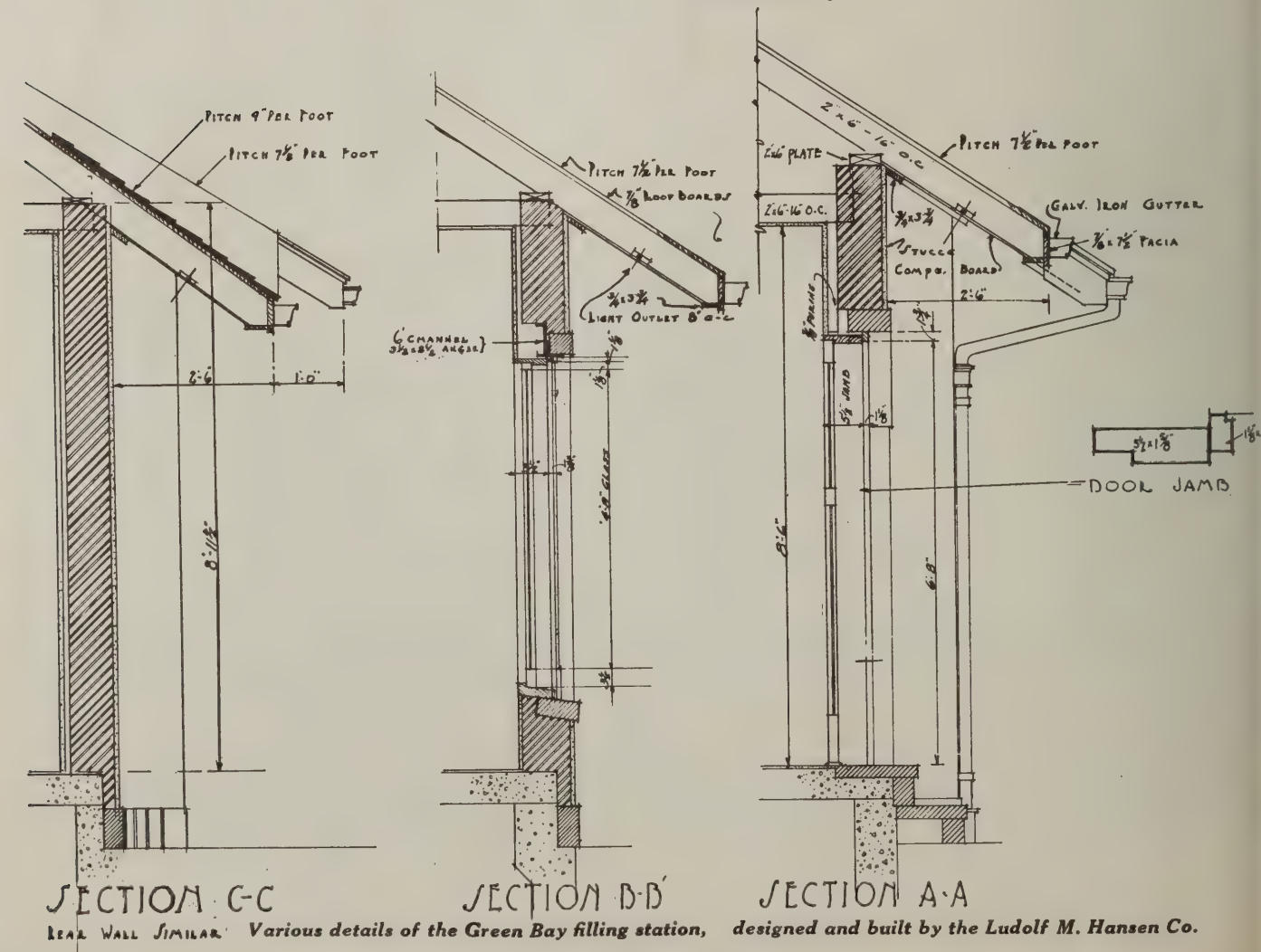
Automobile filling station at Green Bay, Wis., designed and built by the Ludolf M. Hansen Co.



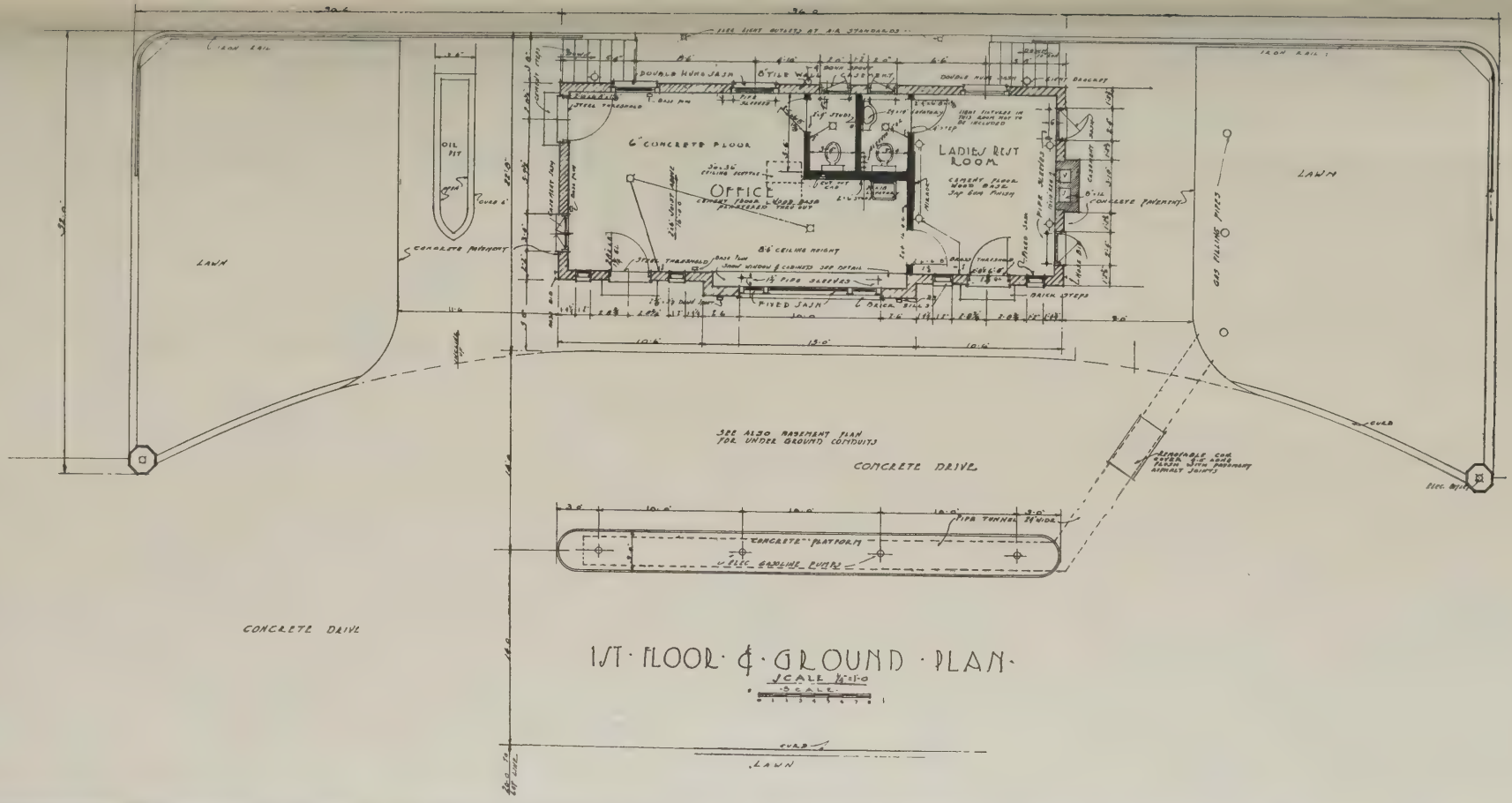


Elevations and landscaping of Green Bay filling station, designed and built by the Ludolf M. Hansen Co.



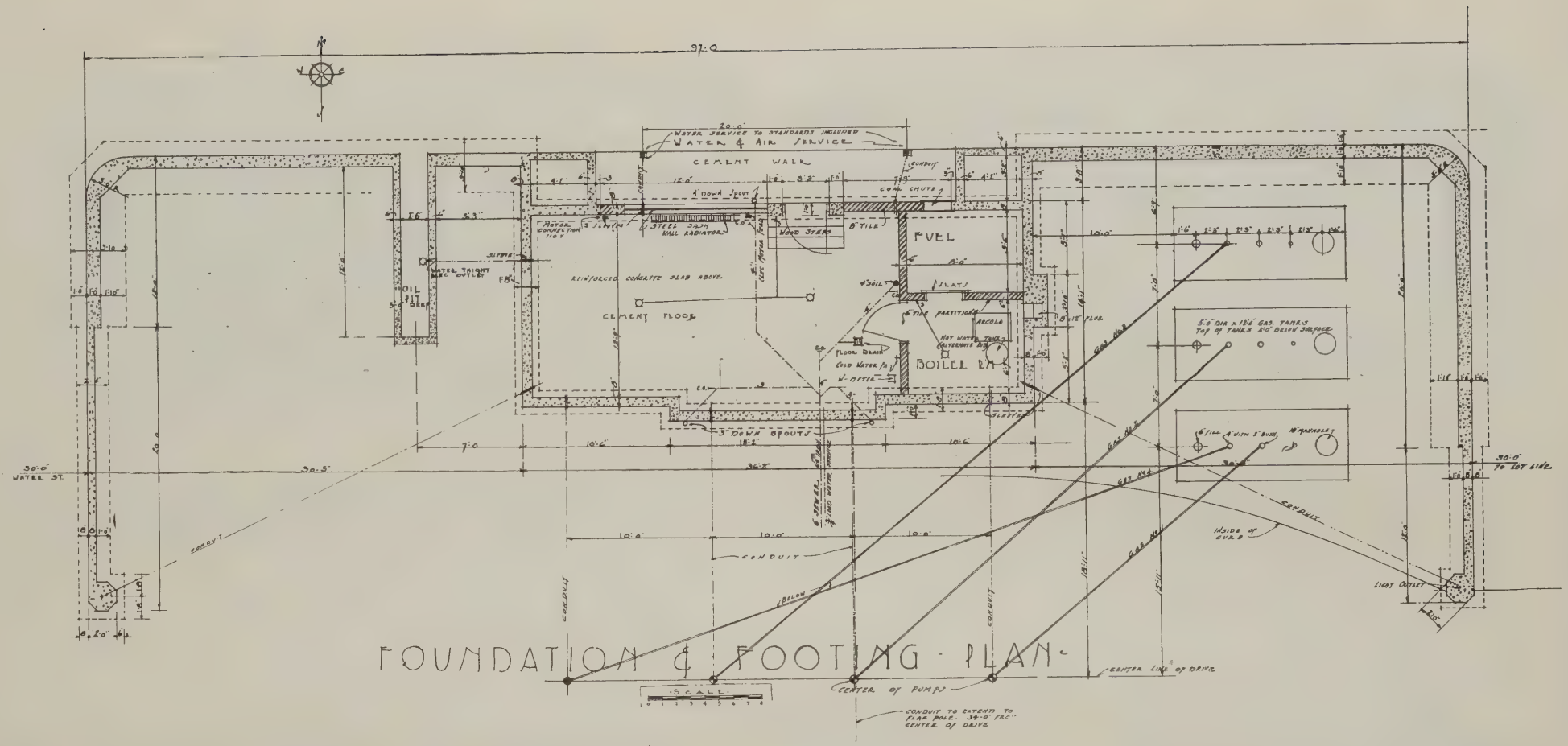


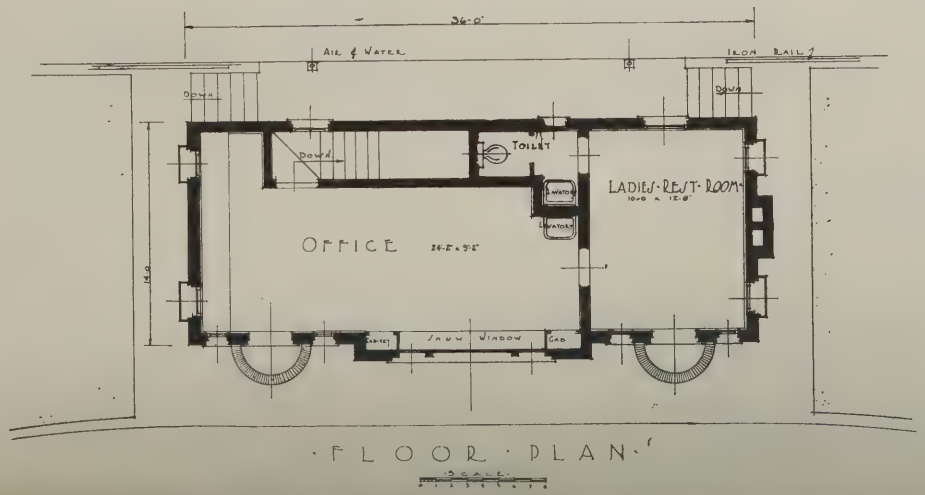
Various details of the Green Bay filling station, designed and built by the Ludolf M. Hansen Co.

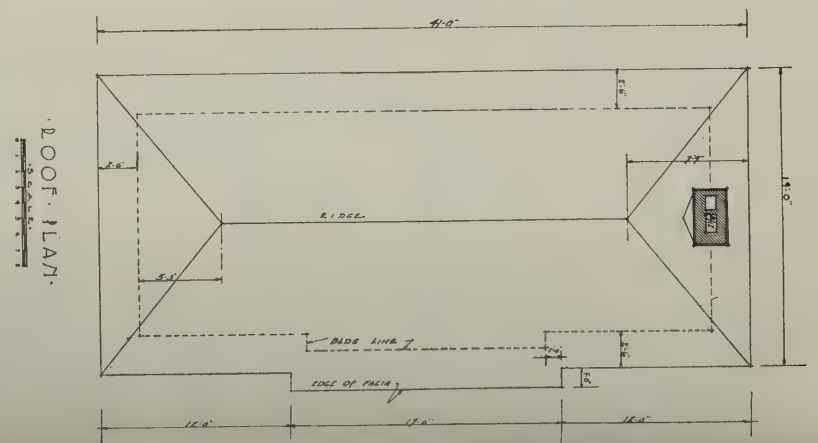


West approach of Green Bay filling station

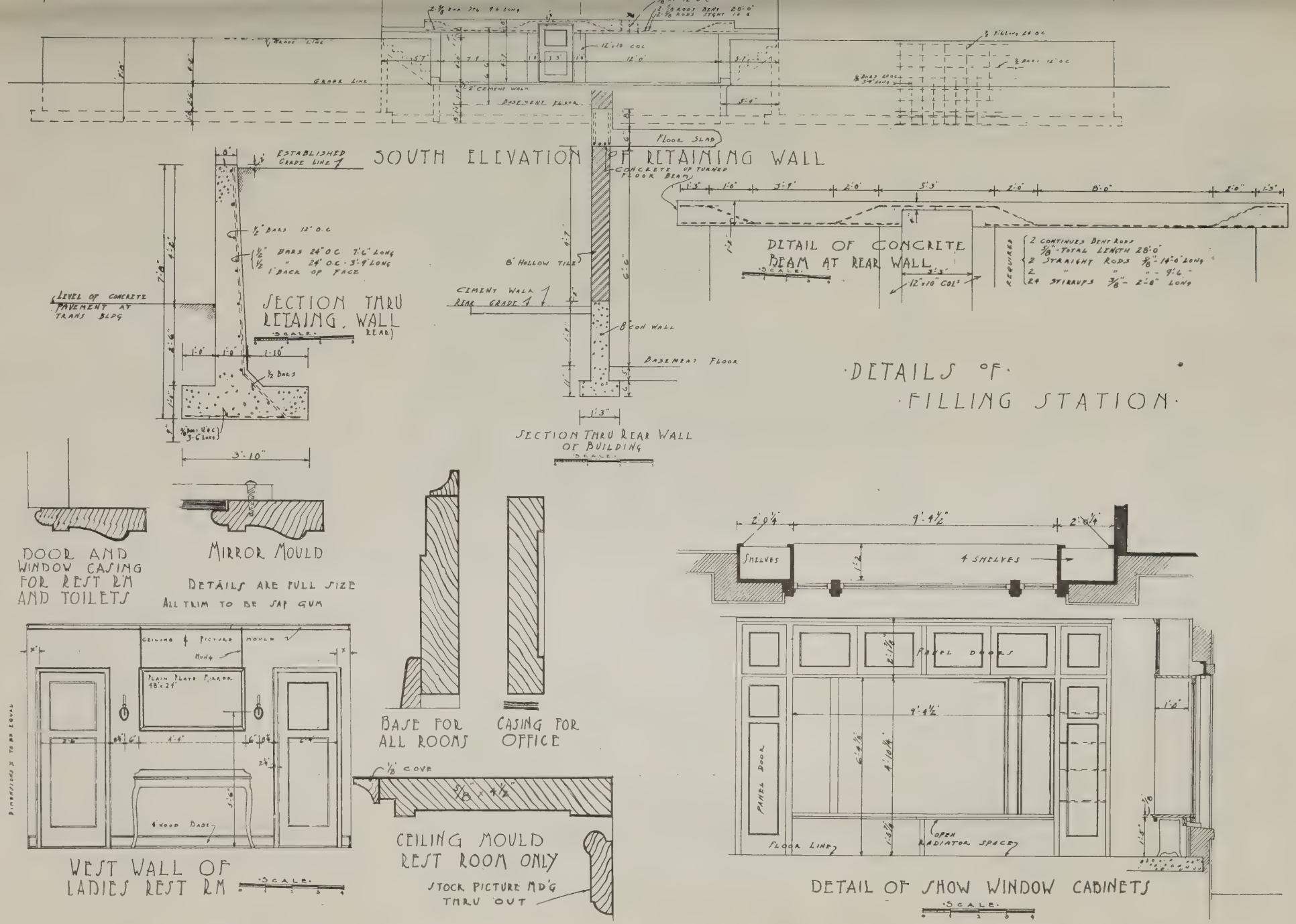
East approach of Green Bay filling station



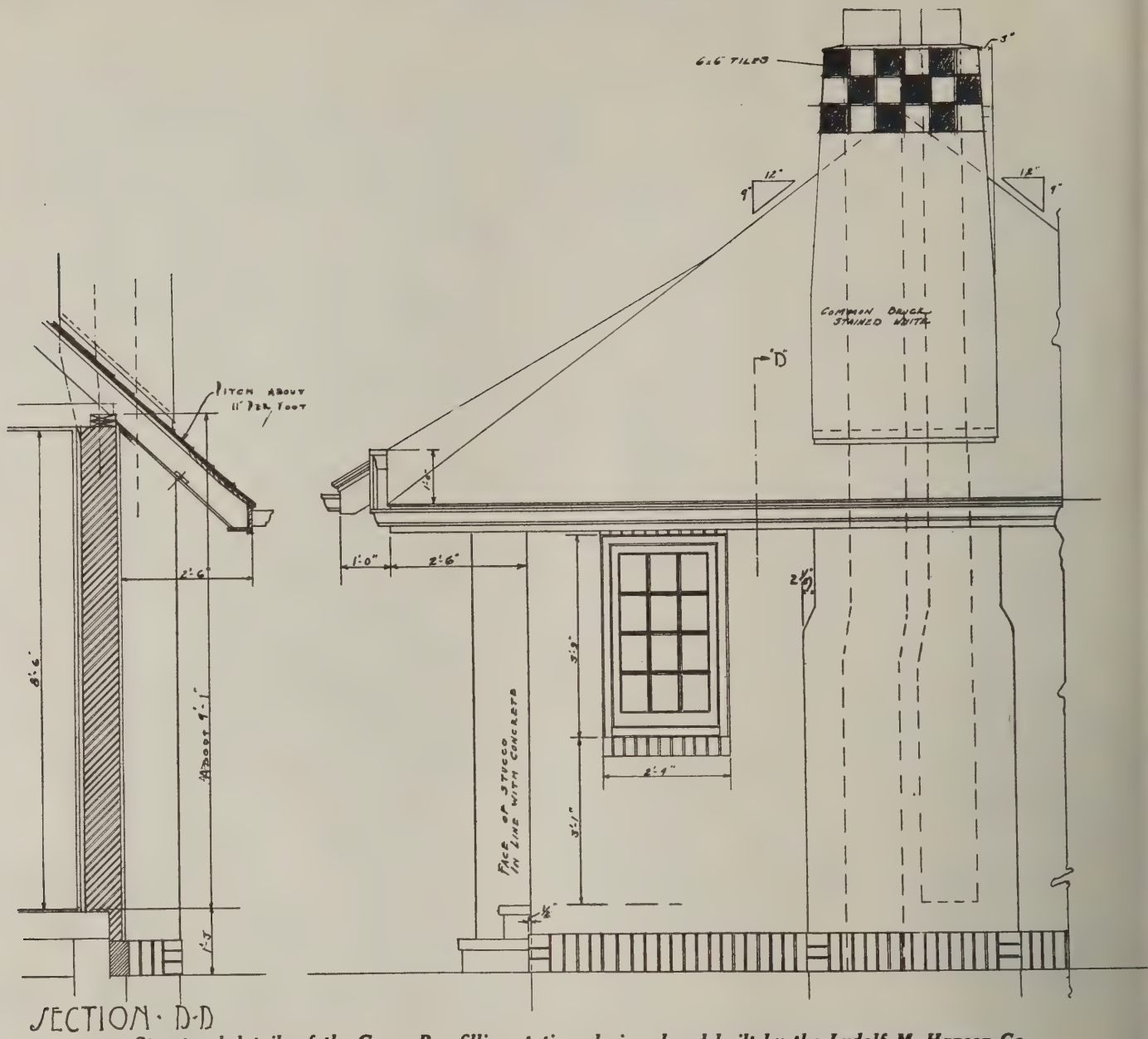




Basement, floor and roof plans of Green Bay filling station, designed and built by the Ludolf M. Hansen Co. Details of ladies' rest room: Doors, window steels, sash and steps; ivory finish. Casings, base, ceiling mid-pale green. Walls, pale blue. Ceiling, sky blue. Outside woodwork; gray, shaded two-tone


SOUTH ELEVATION OF RETAINING WALL
SECTION THRU RETAINING WALL (REAR)
SECTION THRU REAR WALL OF BUILDING
DETAIL OF CONCRETE BEAM AT REAR WALL
DETAILS OF FILLING STATION
DOOR AND WINDOW CASING FOR REST RM AND TOILETS
MIRROR MOULD
DETAILS ARE FULL SIZE
ALL TRIM TO BE SAP GUM
BASE FOR ALL ROOMS
CASING FOR OFFICE
WEST WALL OF LADIES REST RM
CEILING MOULD REST ROOM ONLY
STOCK PICTURE MD'G THRU OUT
DETAIL OF SHOW WINDOW CABINETS

Structural details of Green Bay filling station. Details of ladies' rest room. (See preceding page for specifications)



Structural details of the Green Bay filling station, designed and built by the Ludolf M. Hansen Co.

TIME CARD WEEK ENDING 192

JOB

C. J. PLACE — CONTRACTOR

KIND OF WORK

	S	M	T	W	T	F	TOTAL HRS	RATE PER HR.	TOTAL EARNED	RECEIVED	BALANCE DUE

MR. PLEASE PAY TO

MR.

THE ABOVE AMOUNT.

RECEIVED THE ABOVE AMOUNT

WORKMAN

Contractor's Time Card

C. J. PLACE, contractor, Muskego Heights, Mich., sends the accompanying time card, which he uses in his own work. He specializes in reinforced-concrete construction and has some large and notable buildings, including the John M. Hall Auditorium, Bay View, Mich., to his credit.

Mr. Place states that the card shown herewith serves a fourfold purpose. It can be used by the individual workman to keep his own time; it can be given to the foreman as an order; it is also a receipt for pay or salary received, and it is the foundation of an accurate cost-finding system.

NATIONAL BUILDER will be much pleased to have other contractors submit samples of their time cards, and other features of their cost-finding systems. Here is a medium for exchange for valuable ideas and suggestions. We want you to make more use of it. Let's hear from all who have some ideas on the subject, or any subject about your work.

A 120x16 Foot Hen House for Four Hundred Hens

Plastered Throughout with Special Features

AN experienced poultry man—Erik Johnson—and a building contractor—W. F. Leiser—of Beloit, Wis., are responsible for what is believed to be one of the best hen houses built in this part of the country. It was designed to meet every need that a man of long business experience in raising eggs and chickens has had to contend with.

Every effort was made to have ideal conditions not only so far as the building itself is concerned, but in its location. It has a full southern exposure. It is placed against a hill which protects it from the wind. To the north and west are trees which also help to protect it from the prevailing winter winds. In front is a small orchard, which makes an ideal range in summer. These are all good details that the builder of hen houses as well as the poultry man ought to know.

The building is 120x16 ft. over all; it is divided into five 20-ft. stalls or compartments and two 10-ft. work rooms at opposite ends of the building (east and west ends). Each of the end compartments, or rooms, has an overhead bin for straw and feed. A well with a hand pump is located in the right-hand (east end) compartment, which is 10 ft. wide.

A concrete floor and concrete footings extend throughout the building, and a concrete retaining wall against the hill forms the lower half of the rear wall of the house. The frame is 2x4 studs and the roof 2x6 rafters. The partitions between the stalls are 2x4 studs, flat-way in the partition, boarded on each side, as one of the accompanying views shows. The ceilings and the interior of the rear wall are plastered with a smooth finish, giving the building both warmth and sanitation.

The window construction was especially devised so that the windows may be opened in at the top, as one of the views shows, or lifted out entirely. There are five windows to each stall. Doors screened with chicken-wire netting are provided between each compartment. Doors and windows are provided in feed and straw lofts at each end of the building. There are trap doors in the floors of each loft.

The arrangement of roosts with removable perches is shown in one of the illustrations. The nests are placed on a table in the foreground, in front of the dropping board and perches, and are removable and accessible from either side. The nests had not been installed when the accompanying views were taken.

Four-hundred-hen house near Beloit, Wis., built by W. F. Leiser, contractor, for Erik Johnson

Some General Features of Poultry-House Construction

Farm hens are frequently housed at the rate of one per square foot of floor space. Here somewhat over three square feet are allowed for each hen, and every facility for cleaning and feeding is provided.

Before making plans for poultry and hen houses contractors are urged to write to the Agricultural Experiment Station of their home state. Most of these experiment stations have given much study to the proper design of poultry houses, and many get out detail plans which can be purchased for a small sum.

A common mistake on the part of farmers and poultry men is to be too economical in the size of the building. Contractors should be sufficiently posted to warn prospective clients against this short-sighted economy.

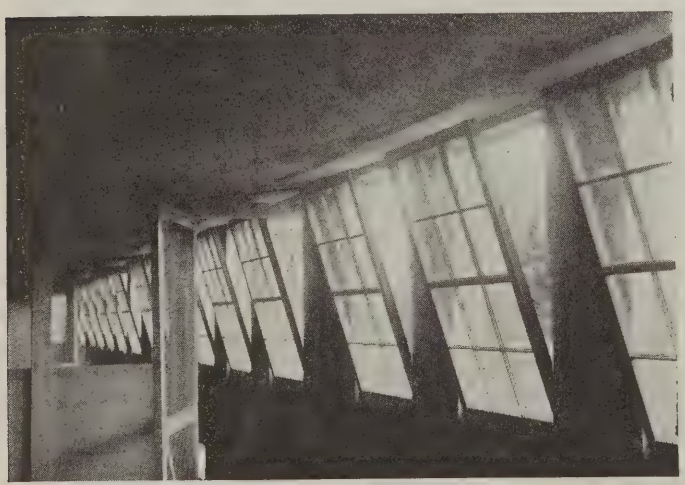
For example, a recent bulletin by the New Jersey Agricultural Experiment Station (No. 370, January, 1923), states: *"Roominess is a quality which must be built into every house.* Overcrowding and lack of sufficient room for exercise often explain a lack of economical production on the part of laying flocks. Enough floor space should be allowed so that each bird will have plenty of room in which to scratch and hunt for its grain without continually being interfered with by other birds. Practical experience has taught us

Beloit hen house under construction, showing up-hill side and construction details

Interior of Beloit hen house during construction, showing details of interior structure

Interior of completed building, showing plastered walls and ceiling and method of construction of partitions

Interior, showing removable perches in place, dropping board, and plastered ceiling and walls



Window construction, showing method of opening. Window sash may be lifted slightly and entirely removed from the casings

Owner (center), and builder (right), of the hen house. Work and pump room end of building is shown here

that about 4 sq. ft. of floor space for each bird is sufficient. This is a general statement which will be somewhat modified by the size of the house and the breed kept. For the lighter breeds slightly less floor space is necessary. In the long run, where large flocks are kept together, less floor space can be allowed per bird than in small pens which are planned for but a few individuals."

In the poultry house described here these facts have been taken into account. Also, as in all well-planned poultry houses, this one is so constructed as to serve as a unit of a much larger structure, whenever a larger structure may be desired. In this case it will be necessary merely to extend the same scheme of construction from the east end, exactly duplicating the structure now built on the west end of the pump house, or feed-mixing chamber.

National Builder Style Sheet

Alfred Jones residence, Lancaster, Pa. Henry Boettcher, architect; Herman Wohlsen, contractor.
(Plans on page 15 of this issue)

Harry M. Dorwart residence, Lancaster, Pa. John B. Harmon, architect; Rudy S. Herr, contractor. (Floor plans of a very similar house in National Builder, December, 1922, page 18, and full details in National Builder, May, 1921)

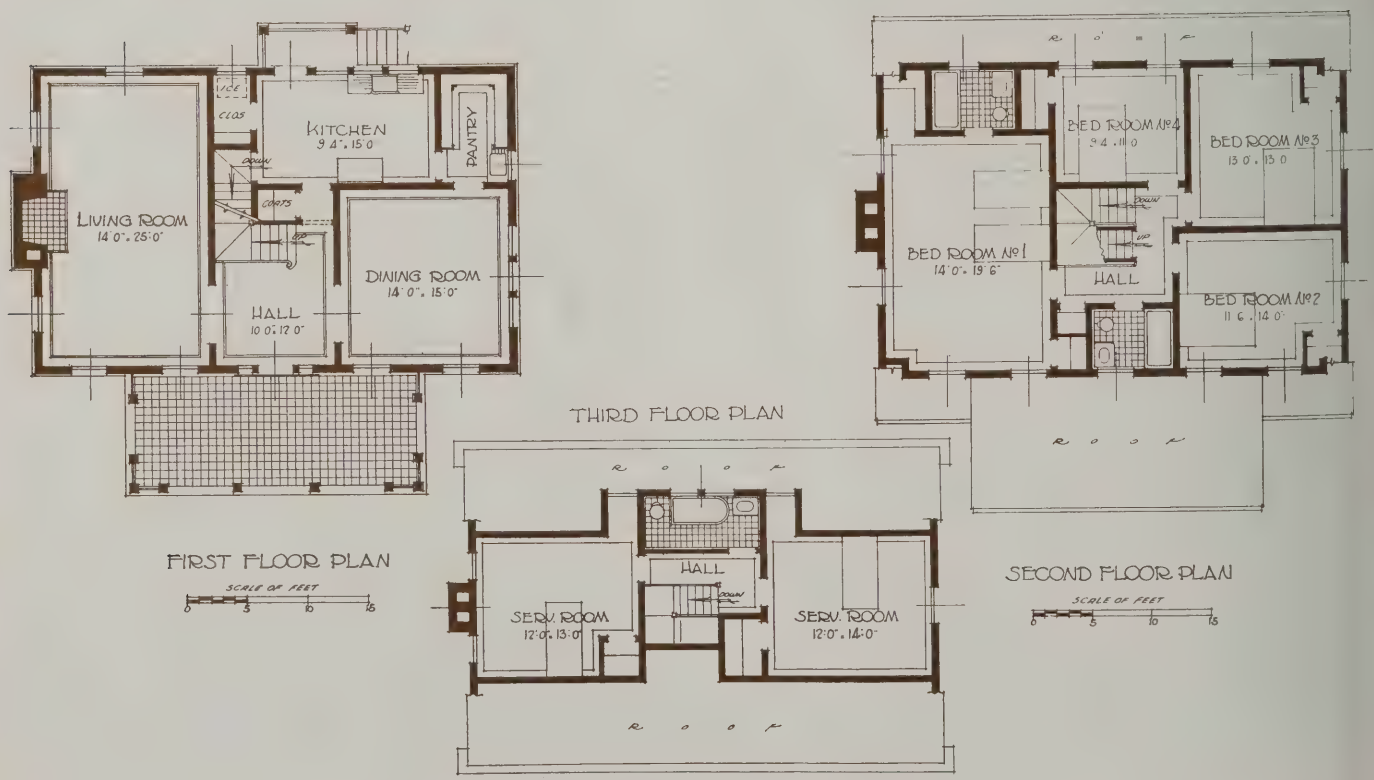
Residence of Ray Clark, contractor, on Lincoln highway, Lancaster county, Pennsylvania. Fred Krug, architect

California stucco house, illustrating attractive use of timber trim

California bungalow of recent design, with particularly attractive porch treatment

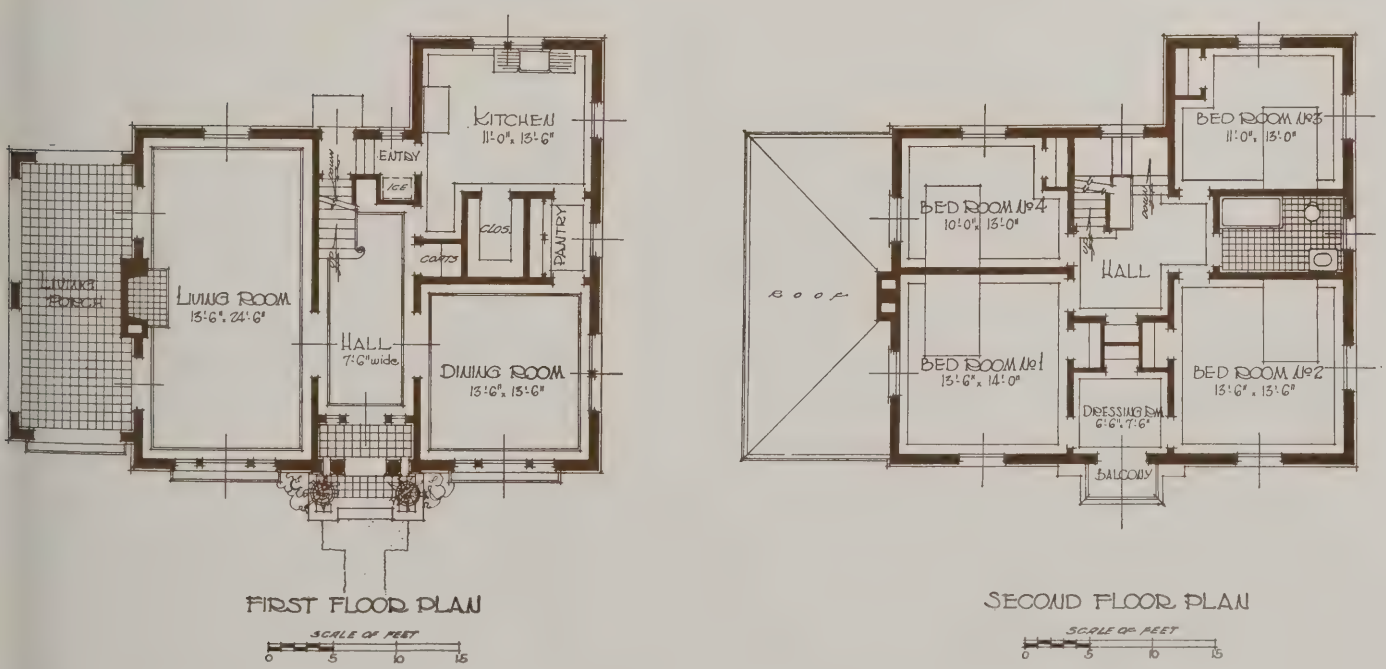
California stucco house of attractive design. Note effect of long, narrow windows in giving the impression of height and dignity

Residence of A. J. Bleecker, Tenafly, N. J. R. C. Hunter & Bro., architects, New York City



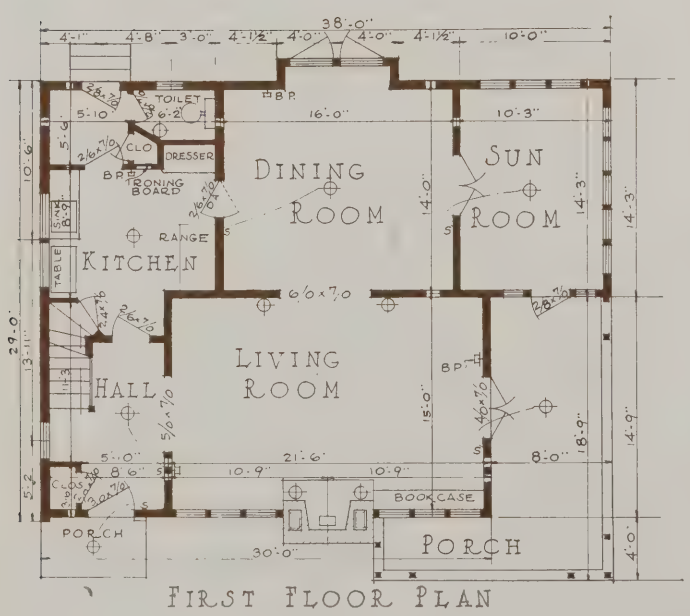
Floor plans of A. J. Bleecker residence. ..R. C. Hunter & Bro., architects

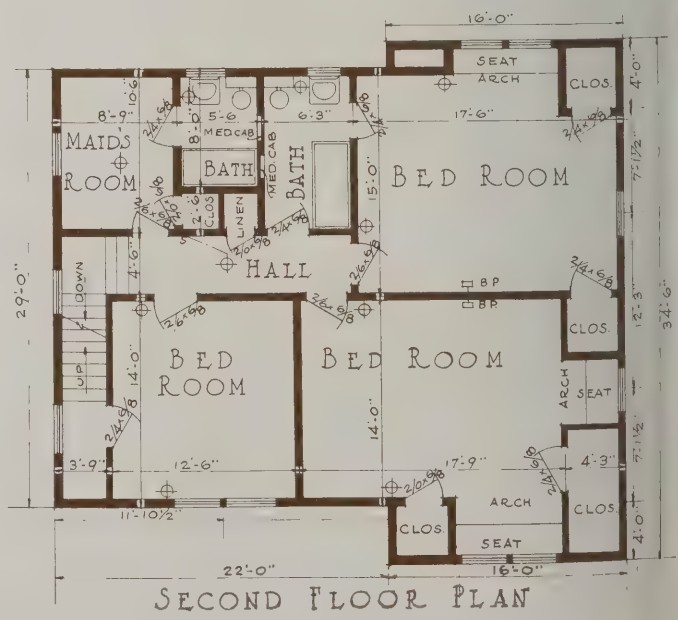
Residence of Mrs. Julia Reitze, Oradell, N. J. R. C. Hunter & Bro., architects, New York City



Floor plans of residence of Mrs. Julia Reitze, Oradell, N. J. R. C. Hunter & Bro., architects, New York City

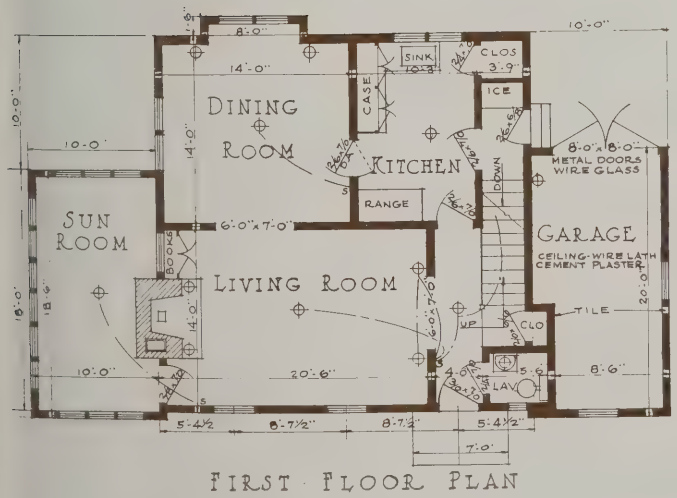
House designed and built by William Watson, builder, Yonkers, N. Y., at Bronxville, N. Y.



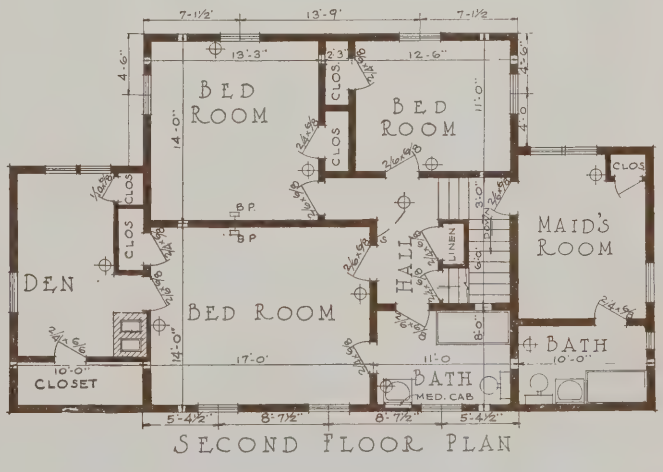


Floor plans of Bronxville house built by William Watson. ***(See pages 49-51 for details)***

Another house designed and built by William Watson, builder, Yonkers, N. Y., a story of whose operations appears on pages 49 to 51 of this issue of National Builder



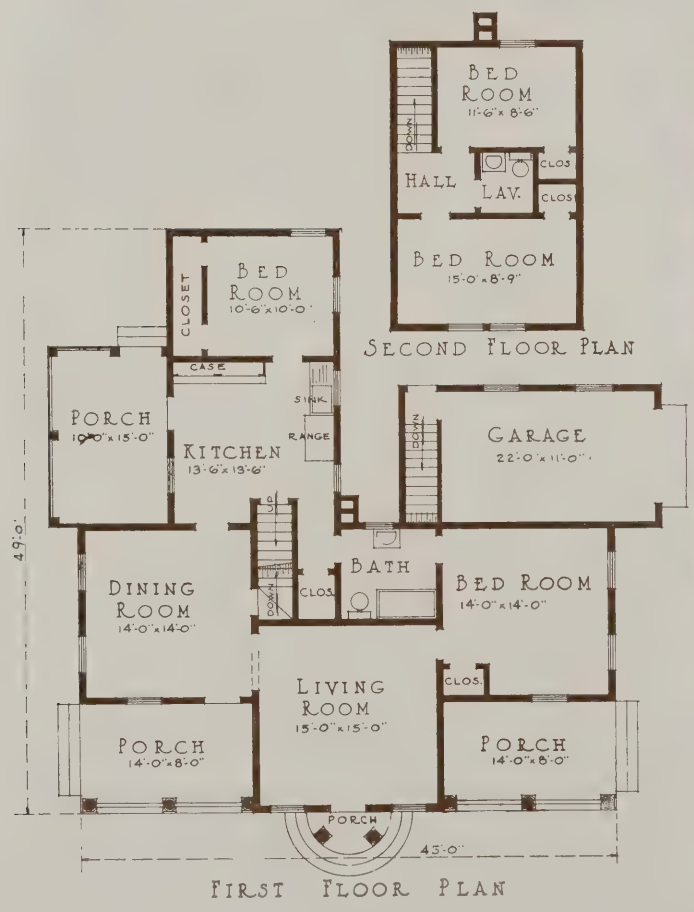
FIRST FLOOR PLAN



SECOND FLOOR PLAN

Floor plans of house designed and built by William Watson, builder, Yonkers, N. Y.

Home of E. B. Trimpey, photographer and artist, Baraboo, Wis., redesigned by himself from the old house shown on the opposite page



Floor plan of Trimpey home

Another view of the Trimpey house, showing garage

LET the reader take note that all "Style Sheet" houses are not necessarily new ones. Here is a case where an artist made an old and unattractive, yet well-built, house a really stylish house by a few effective touches. There is a big field here for wide-awake builders and contractors.

Don't Neglect Building Alteration Opportunities!

Rising Prices of Materials and Labor Also Increase the Value of Work Done, Even if Half a Century Old

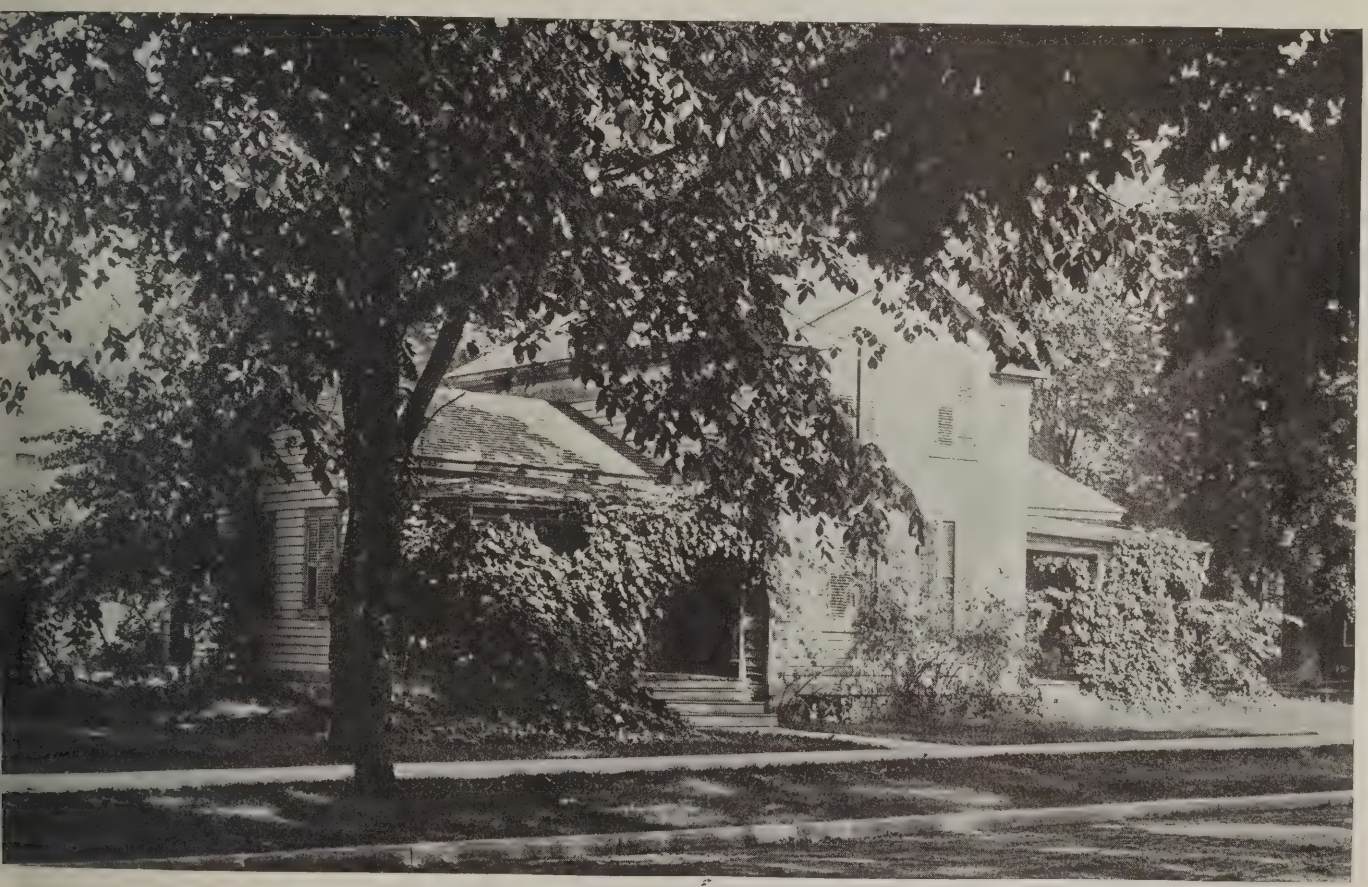
N the present stampede to erect new buildings, wide-awake builders and contractors should not overlook opportunities serving their clients in remodeling and tering present structures to make them tter looking and more convenient. For e small city and town builder, as the mmunity building expert, must always ar in mind that the broadest and most eful definition of his place in the comunity is just that of professional advisor his less informed clients—the laymen far as the construction industry is conned.

Many prospective clients are dissatisfied h their present quarters—both business domestic—but are disinclined to spend money for new buildings. Such clients not to be passed up by the enterprising tractor. On the contrary, he uses his best nts and business judgment to convince m that remodeling and altering an old building will be a good investment.

A good illustration of what can be done to make an old home acceptable for a "Style Sheet" house is given on the opposite page. Unfortunately in this particular instance we are not able to give a builder or contractor the credit for the initiative in making the remarkably simple changes which resulted in such a striking transformation. For in this case the owner—an artist and photographer—conceived the idea and superintended the work. Nevertheless, there is no reason why the builder and contractor can not learn to see the same kind of opportunity.

This house is at Baraboo, Wis. The original building is shown on this page. This house with the trees and shrubbery about it was not unattractive in its original shape. But the new owner saw opportunities to make it really strikingly attractive. And the changes, as the views and floor plans on the opposite page show, were very simple and not expensive.

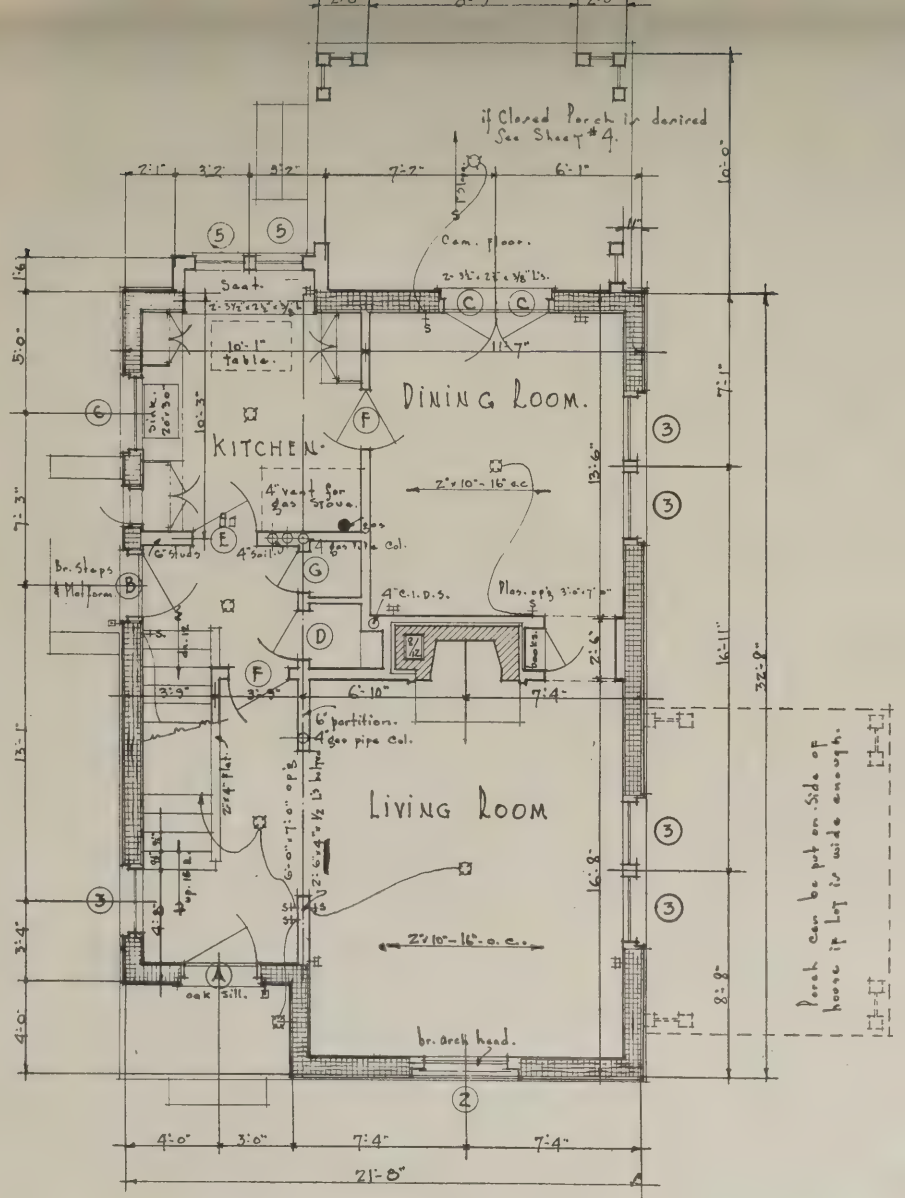
The addition of the built-in garage gives the house a really ultra-modern appearance. The coating of stucco, of course, is a much used method of renovating old buildings. The frames of many old buildings, as every builder knows, are often as well or better put together and of sounder lumber than many houses built in the last decade.



Trimpey house at Baraboo, Wis., before changes shown on opposite page were made

In remodeling work of the kind illustrated the contractor will generally do well to seek the advice of a really good architect. While it is considered unethical for the architect himself to solicit work of this kind from the owner, it is both good ethics and good business for the contractor to look for opportunities to renovate his town by direct, personal solicitation. Then of course it is proper for him to call on an architect for professional assistance.

TRADE MARK
5A54

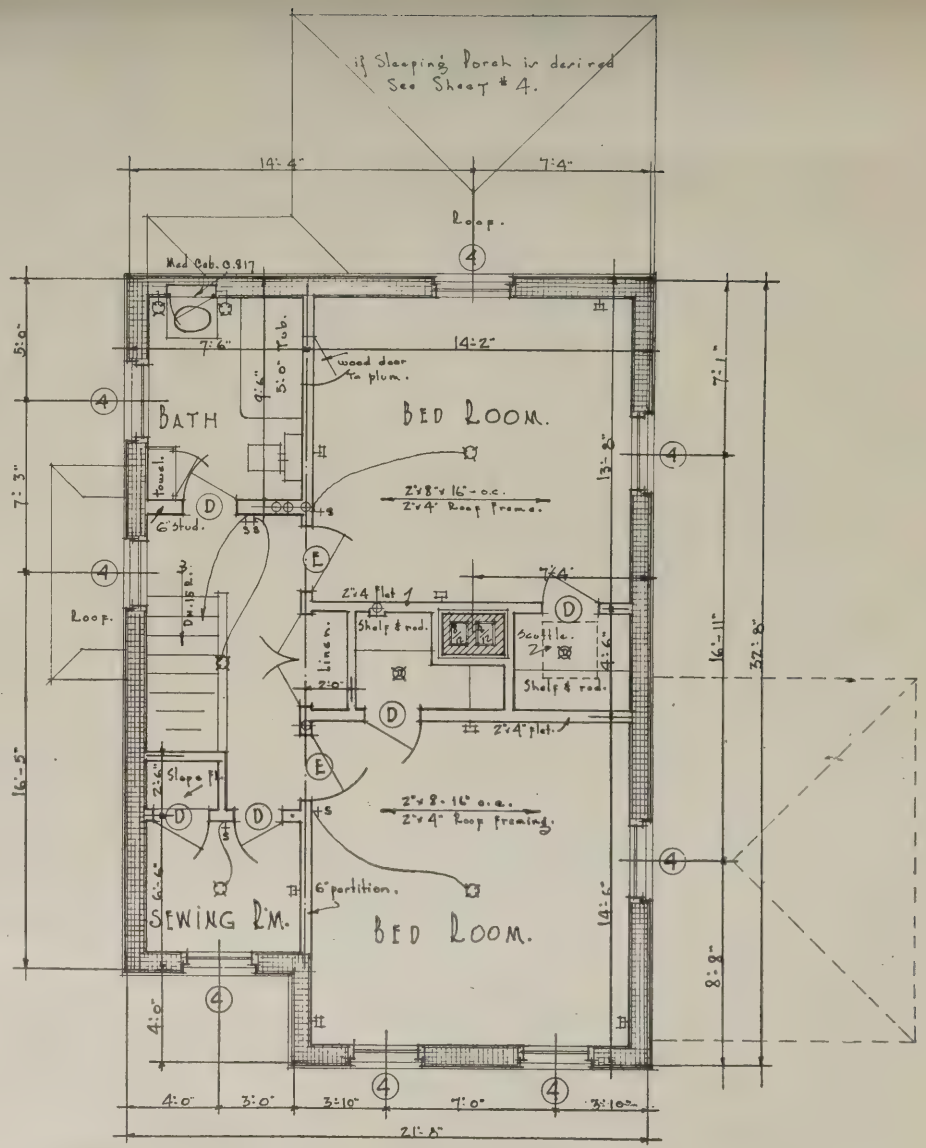


·FIRST FLOOR PLAN·

Scale 1/4"=1'-0"

1 2 3 4 5 6 7 8

Scale



·SECOND FLOOR PLAN·

Scale 1/4"=1'-0"

1 2 3 4 5 6 7 8

Scale

Floor plans of House No. 5A54, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc. Copyrighted by National Builder and The Architects' Small House Service Bureau

Hollow-Tile Stucco City House No. 5A54

A NARROW flat roofed five-room house designed especially for city conditions is shown here.

It can be built close to the street, and as the main outlook is front and back it is ideally adapted to an inside lot. The width is 21 ft. 8 in., so that it can be built in most cities on a 30-ft. lot. On a wider lot the porch can be built at the side, in which case a 40-ft. frontage would be required.

The construction is hollow tile with stucco exterior finish and wood cornice. This design has practically the same floor plan as No. 5A53, shown in the March issue of NATIONAL BUILDER. The latter plan calls for wood frame, with stucco finish on metal lath and is English in style. If you like the layout of this design, you thus have the choice of different materials and two entirely different exteriors to choose from.

The variation offered by the porch is a desirable feature of this plan. While a good many home builders demand a sun room nowadays, there are still many others who prefer the good, old-fashioned porch, with the breezes sweeping across it in summer time. This design provides the working drawings for both an enclosed and open porch and for a porch with sleeping porch above.

The hall leading from the front of the house to the back is a point that should appeal to women, because it means that it is unnecessary to pass through the living or dining room to reach other rooms.

In the side entry, where it is handy to both entrances, is a coat closet. Beside it is another good closet for brooms and mops. The stairs to the basement also lead from this side entry.

The nicely proportioned living room has a fireplace of brick with wood mantel. There is a built-in bookcase in the cased opening between dining room and living room.

Another convenience that will be appreciated by the modern household is the breakfast nook in the kitchen which can be built as suggested on the floor plan.

The two bedrooms have light and air from two sides, and each bedroom has a good clothes closet. The linen closet is conveniently placed in the hall, and there is a towel closet in the bathroom.

The small sewing room, with closet for storage, is a desirable feature.

This house is designed to face west or south. Reversed plans for east or north facing are furnished without extra charge.

The regular price of this plan is $25. Half price to NATIONAL BUILDER subscribers (add 50 cents for postage and packing).

EXCAVATING—170 cu. yds.

BACKFILL—30 cu. yd.

FOUNDATION—If 12″ concrete, 44 cu. yd. gravel, 178 sax cement; if 9″ concrete, 35 cu. yd. gravel, 142 sax cement; if 12″ tile, 21000 CBM tile, 15 cu. yd. mortar; if 9″ tile, 16600 CBM tile, 12 cu. yd. mortar; 300 face brick for steps.

TILE FOR WALLS—22500 CBM tile; 16 cu. yd. mortar.

CEMENT FLOOR AND STEPS—6 cu. yd. gravel; 4 cu. yd. sand; 60 sax cement.

CHIMNEY—2520 common brick; 100 fire brick; 50 lin. ft. 8x12 flue tile; 16 sq. ft. hearth tile; 20 lb. fire clay; 2 cu. yd. mortar; 1 cast-iron ash dump; 1 throat and damper; 1 angle 4x3x5/16, 4′ 0″; 2—8x10 cleanouts; 2—6″ adjustable thimbles; 3 yd. metal lath.

LATH—9 yd. metal lath over boiler; 5600 wood lath.

PLASTER—265 sq. yd. stucco on tile; 9 sq. yd. plaster on metal lath; 400 sq. yd. plaster on wood lath; 15 sq. yd. Keene's cement; 210 sq. yd. plaster on tile inside plaster.

TILE FLOORS—54 sq. ft. ceramic tile; 27 lin. ft. cove base.

COPING—110 lin. ft. cement coping.

LUMBER—3—2x10-14 stair horses; 4 ft. 2″ plank cleanout cover; 3—2x4-16 partition plates; 10—2x4-8 partition studs; 160 ft. D&M partition sheathing; 22—2x10-22 first-floor joist; 4—2x10-14 first-floor joist; 4—2x10-22 doubles; 2—2x10-16 headers; 660 ft. com. bds. subfloor first floor; 900 ft. 13/16x 1½ finish floor first floor; 264 lin. ft. 1x3 bridging; 192 lin. ft. 2x4 first floor partition plates; 56—2x 4-9 first-floor partition studs; 6—2x4-14 opening doubles; 4—2x4-16 opening headers; 4—2x10-16 stair horses; 22—2x10-22 second-floor joist; 4—2x10-14 second-floor joist; 4—2x10-22 doubles under partitions; 3—2x10-12 headers; 246 lin. ft. 2x4 second-floor partition plates; 72—2x4-8 second-floor partition studs; 22—2x8-22 second-floor roof joist; 4—2x8-14 second-floor roof joist; 22—2x4-22 second-floor ceiling joist; 4—2x4-14 second-floor ceiling joist; 660 ft. com. bds. second floor subfloor; 900 ft. 13/16x1¼ second floor finish floor; 800 ft. D&M roof sheathing; 1100 lin. ft. grounds; 2—2x10-14 porch girders; 4—2x10-10 porch girders; 12—2x4-10 porch ceiling joist; 14—2x4-12 porch rafters; 2—2x4-16 porch rafters; 150 ft. com. bds. porch roof sheathing; 1¼ M shingles porch roof; 4—2x4-16 roof joist headers; 22—1x6-14 roof joist braces; 4—2x8-16 ceiling joist headers; 25—2x 4-16 scaffold; 6—2x8-14 scaffold; 8—2x6-16 scaffold; 6—2x10-12 scaffold; 10—2x4-16 lookouts; 12—2x4-16 roof supports and plates; 230 ft. ceiling for porch.

ROOFING—7½ squares roofing.

FLASHING—110 lin. ft. flashing.

MILLWORK—Frames: 4 single 8x10-3L-1⅜; 1 mul. 8x10-3L-1⅜; 1 wd. 9x13-16L-1⅜; 1 wd. 9x13-6L-1⅜; 2 mul. 9x13-6L-1⅜; 7 single 9x12-6L-1⅜; 1 mul. 7x18-3L-1⅜; 1 single 8x18-4L-1⅜; 1 single 9x12-6L-1⅜ with panel at bottom. **Windows:** 6 sash 8x10-3L-1⅜; 1 wd. 9x13-16L-1⅜; 5—9x13-6L-1⅜; 8—9x12-6L-1⅜; 2—7x18-3L-1⅜; 1—8x18-4L-1⅜. **Storm Sash:** 6—8x10-3L-1⅜; 1—9x13-16L-1⅜; 5—9x13-6L-1⅜; 8—9x12-6L-1⅜; 2—7x18-3L-1⅜; 1—8x18-4L-1⅜. **Screens:** 6—8x10-3L-1⅜; 1—9x13-16L-1⅜; 5—9x13-6L-1⅜; 8—9x12-6L-1⅜; 2—7x18-3L-1⅜; 1—8x18-4L-1⅜. **Shutters:** 8 pr. for windows 9x12-6L-1⅜. **Outside Door Frames:** 1 icing dr. fr.; 1 dr. fr. 3′0″x7′0″-1¾; 1 dr. fr. 2′8″x6′8″-1¾; 1 double-door fr. 4′4″x7′0″-1¾. **Outside Doors:** 1 icing door (f); 1 door 3′0″x7′0″-1¾ (C113); 1 2′8″x6′8″-1¾ (see elev.); 2 2′2″x7′0″-1¾ (C321); 1 astragal for 7′0″ doors. **Storm Doors:** 1—3′0″x7′0″-1⅜; 1—2′8″x6′8″-1⅜; 1 pr. dr. each 2′2″x7′0″-1⅜. **Screen Doors:** 1—3′0″x7′0″-1⅜; 1—2′8″x6′8″-1⅜; 1 pr. dr. each 2′2″x7′0″-1⅜. **Outside Millwork;** 110 lin. ft. main cornice; 60 lin. ft. ceiling cove; 60 lin. ft. porch cornice; 7 porch posts; 5 lattice frames 1′0″x7′0″; 1 special trim for front entrance. **Interior Doors:** 6—2′4″x6′8″-1⅜ (C304); 3—2′8″x6′8″-1⅜ (C304); 2—2′6″x7′0″-1⅜ (C304); 1—1′8″x6′8″-1⅜ (C304); 1—2′8″x6′8″-1⅜ (5XP). **Jambs:** 6—2′4″x6′8″; 3—2′8″x6′8″; 2—2′6″x7′0″; 1—1′8″x6′8″; 1—2′8″x6′8″; 1—6′0″x7′0″. **Interior Trim:** 4 sides trim 8x10-3L; 1 mul. trim 8x 10-3L; 1 single trim 9x13-16L; 1 single trim 9x 13-6L; 2 mul. trim 9x13-6L; 8 single trim 9x12-6L; 1 mul. trim 7x18-3L; 1 single trim 8x18-4L; 1 single trim 9x12-6L; 1 icing door trim; 1 door trim 3′0″x7′0″; 1 door trim 2′8″x6′8″; 1 door trim 4′4″x7′0″; 12 door trims 2′4″x6′8″; 6 door trims 2′8″x6′8″; 4 door trims 2′6″x7′0″; 2 door trims 1′8″x6′8″; 2 side door trims 2′8″x6′8″; 2 side opening trims 6′0″x7′0″; 1 flight basement stairs, with rail; 1 flight main stairs, with rail; 1 scuttle door; 1 scuttle door jamb; 1 scuttle door trim; 1 linen closet; 1 utility door; 1 utility door jamb; 1 utility door trim; 1 medicine cabinet (C817); 1 towel cabinet; 1 mantel shelf; 1 bookcase; 1—3′0″ kitchen cabinet; 2—2′8″ kitchen cabinets, with work table; 2 drainboards; 1—5′6″ seat; 480 lin. ft. base; 480 lin. ft. base shoe; 480 lin. ft. base molding; 248 lin. ft. picture molding; 144 lin. ft. ceiling cove; 10 lin. ft. closet shelving; 10 lin. ft. closet hook strip; 10 lin. ft. closet clothes pole; 26 lin. ft. band molding; 10 lin. ft. threshold. **Note:** If dining room, living room and vestibule trim is changed it will affect the following items: 1 door 3′0″x7′0″-1¾ (C-113); 1 door trim 3′0″x7′0″; 1 jamb 6′0″x7′0″; 2 side trim 6′0″x7′0″; 1 main stair with rail; 1 mantel shelf; 1 bookcase; 2 doors 2′6″x7′0″-1⅜ (C304); 1 jamb 2′6″x7′0″; 2 side trim 2′6″x7′0″; 2 doors 2′2″x7′0″-1¾ (C321); 1 side trim 4′4″x7′0″; 2 sides mul. trim 9x13-6L; 1 side single trim 9x13-6L; 1 side single trim 9x13-16L; 144 lin. ft. ceiling cove; 144 lin. ft. picture molding; 130 lin. ft. base; 130 lin. ft. base shoe; 130 lin. ft. base molding; 620′ 13/16x1½ finish flooring.

TINWORK—110 lin. ft. cornice flashing; 2—12x16 metal vents with louvres; 40 lin. ft. flashing tin; 200 tin shingles; 42 lin. ft. hanging gutter; 3 outside miters; 1 inside miter; 2 gutter ends; 2 nipples; 2 strainers; 2 shutoffs; 2 elbows; 10 gutter hangers; 20 lin. ft. conductor; 6 conductor hooks; 12 lin. ft. chimney flashing.

INSULATION—3 rolls felt for floors; 600 ft. flaxlinum or equal for ceiling.

WEATHER STRIPPING—6 sash 8x10-3L; 1 wd. 9x13-16L; 5 wd. 9x13-6L; 8 wd. 9x12-6L; 2 wd. 7x18-3L; 1 wd. 8x18-4L; 1 dr. 3′0″x7′0″; 1 dr. 2′8″x6′8″; 1 pr. dr. 2′2″x7′0″.

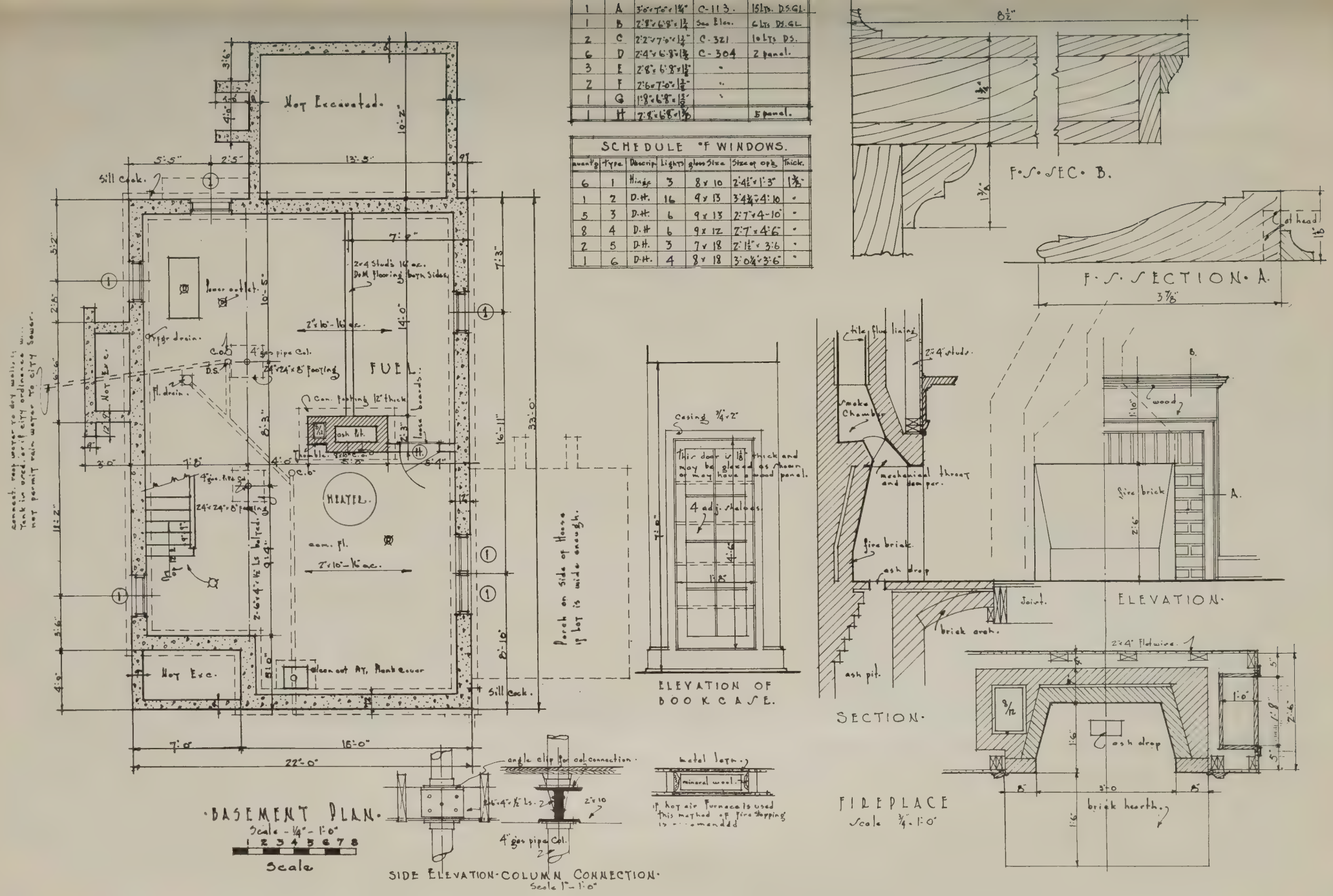
CAULKING—15 single frames; 4 mul. frames; 2 single door frames; 1 double door frame; 1 icing door frame; 1 coal chute.

STEEL—2—4″ gas pipe columns in basement; 28 lin. ft. steel beam built up; 2—4″ gas pipe columns first floor; 28 lin. ft. built up steel beam; 2—4″ gas pipe columns second floor; 28 lin. ft. built up beam; 64 lin. ft. 3½x2½x⅜ angles; 116 lin. ft. 2½x2½x¼ angles; 5 lin. ft. ornamental rail.

HARDWARE—6 cellar sash sets; 17 sash locks; 17 sash lifts; 23 storm sash sets; 23 screen sets; 8 sets of shutter hardware for pairs; 1 icing door set with butts; 1 front door set with butts; 1 rear door set with butts; 1 double door set with butts; 2 single storm door sets; 1 double storm door set; 2 single screen door sets; 1 double screen door set; 1 floor hinge; 2 push plates; 12 inside door sets with butts; 17 door bumpers; 2 doz. clothes hooks; 800 lb. assorted nails; 510 lb. sash weights; 6 lb. assorted brads; 1 coal chute; 4 stair rail brackets; 1 pr. hinges for bookcase door; 1 cupboard turn; (linen cabinet: 2 pr. ornamental butts; 1 cupboard turn; 1 elbow catch, 4 drawer pulls); (kitchen cabinet: 9 pr. ornamental butts; 5 cupboard turns; 4 elbow catches; 4 drawer pulls); 1 pr. hinges for scuttle door; 4 friction stays, utility door; (medicine cabinet: 1 pr. ornamental butts; 1 cupboard turn); (towel cabinet: 1 pr. ornamental butts; 1 cupboard turn); (kitchen cabinet: 2 pr. ornamental butts; 1 cupboard turn; 1 elbow catch).

EXTERIOR PAINTING—2 gal. trim paint; 5 gal. shingle stain; ½ gal. sash color; 1 gal. frame paint; ½ gal. screen paint; ¼ gal. shutter paint; 1 gal. oil; ½ gal. turpentine; ½ gal. porch paint.

INTERIOR PAINTING—8 gal. white paint; 6 gal. enamel; 3 gal. filler stain; 1½ gal. shellac; 4 gal. varnish; 2 gal. floor shellac; 4 gal. floor varnish; 1 gal. oil; 1 gal. Japan; 6 lb. putty; 1 doz. sheets sandpaper; 2 pkgs. steel wool.

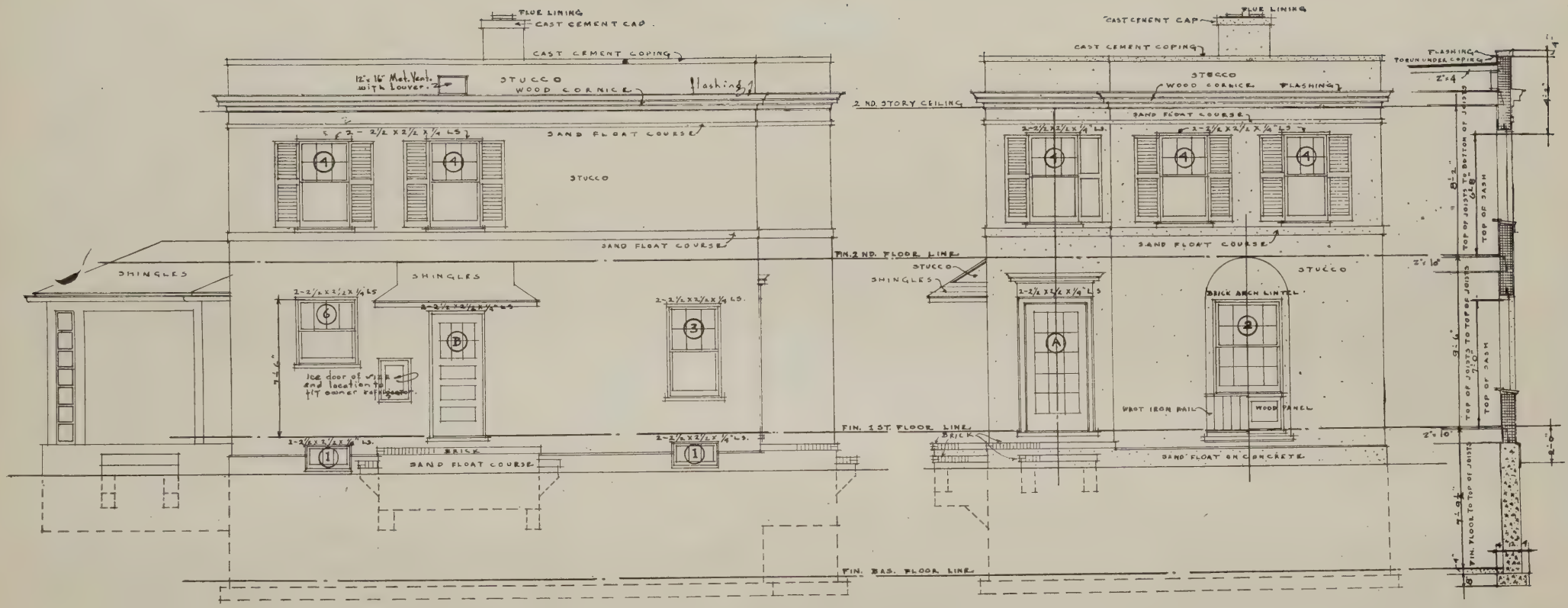


1	A	3'-0"x7'-0"x1 3/4"	C-113.	15 Lts. D.S.G.L.
1	B	2'-8"x6'-8"x1 3/4"	See Elev.	6 Lts D.S.G.L.
2	C	2'-2"x7'-0"x1 3/4"	C-321	10 Lts D.S.
6	D	2'-4"x6'-8"x1 3/4"	C-304	2 panel.
3	E	2'-8"x6'-8"x1 3/4"	"	
2	F	2'-6"x7'-0"x1 3/4"	"	
1	G	1'-8"x6'-8"x1 3/4"	"	
1	H	2'-8"x6'-8"x1 3/4"		5 panel.

SCHEDULE "F WINDOWS.

Quant'y	Type	Descrip.	Lights	glass Size	Size of opg.	Thick.
6	1	Hinge	3	8 x 10	2'-4 1/2" x 1'-3"	1 3/8"
1	2	D.H.	16	9 x 13	3'-4 3/4" x 4'-10"	"
5	3	D.H.	6	9 x 13	2'-7" x 4'-10"	"
8	4	D.H.	6	9 x 12	2'-7" x 4'-6"	"
2	5	D.H.	3	7 x 18	2'-1 1/2" x 3'-6"	"
1	6	D.H.	4	8 x 18	3'-0 3/4" x 3'-6"	"

Basement plan and details of House No. 5A54. Copyrighted by National Builder and The Architects' Small House Service Bureau



Side and front elevations of House No. 5A54, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc. Copyrighted by National Builder and The Architects' Small House Service Bureau

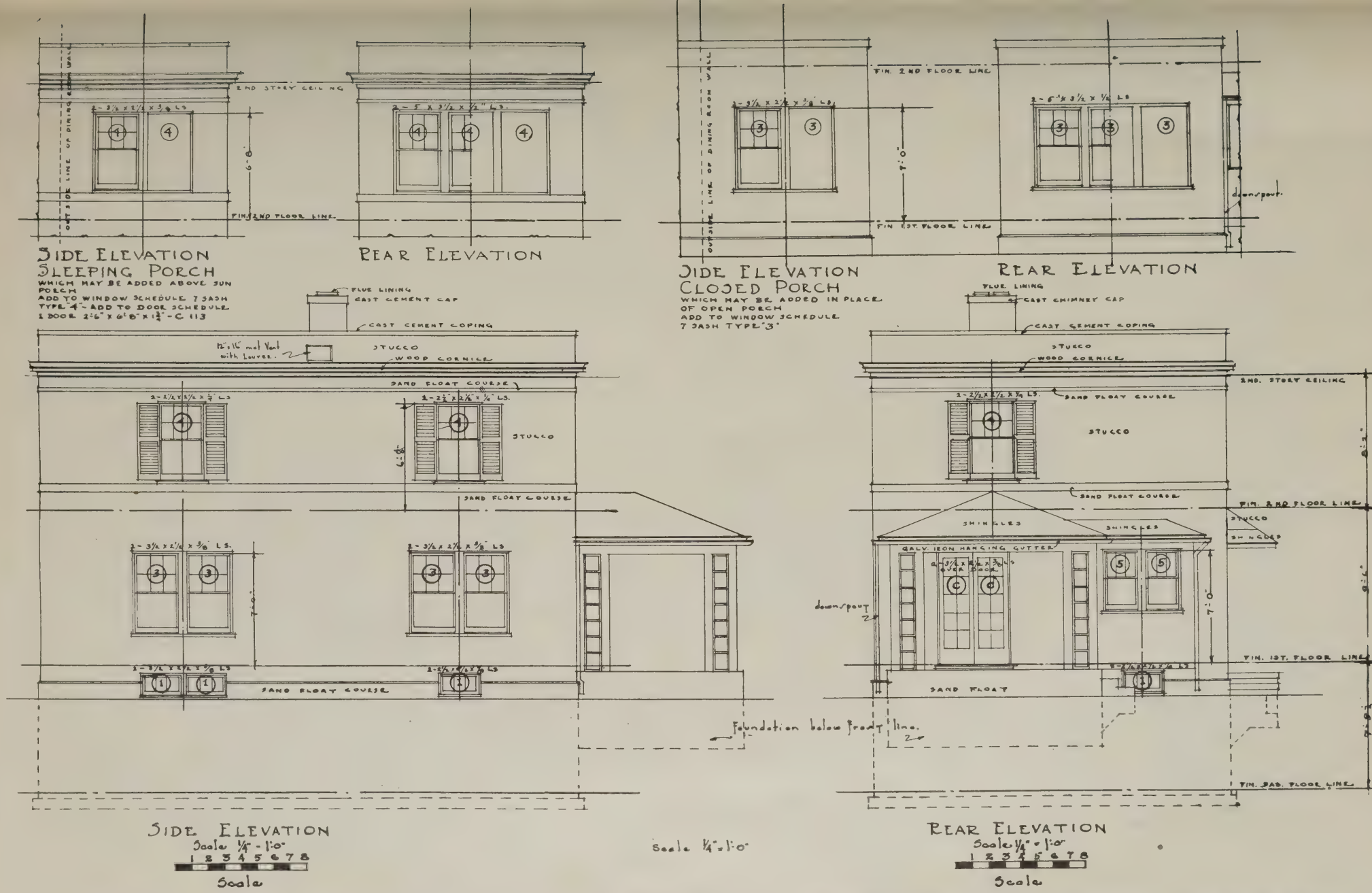
Dimensions are taken to outside of foundation walls, to outside of studs on exterior walls and center of studs for partitions.

Foundation walls shown concrete may be stone, brick, concrete block or load-bearing hollow tile.

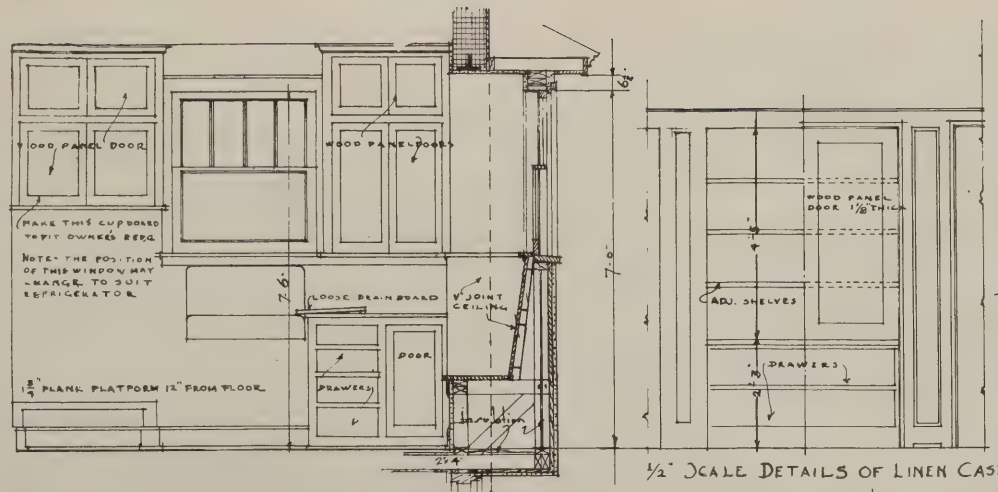
Where building ordinances permit, foundation walls may be 9 in. thick (with 20x9-in. footings), except in case of stone, which shall be 18 in. thick.

Stock numbers refer to moldings in Universal Millwork Design Book No. 20. In case these moldings cannot be procured, others of similar design and size may be substituted.

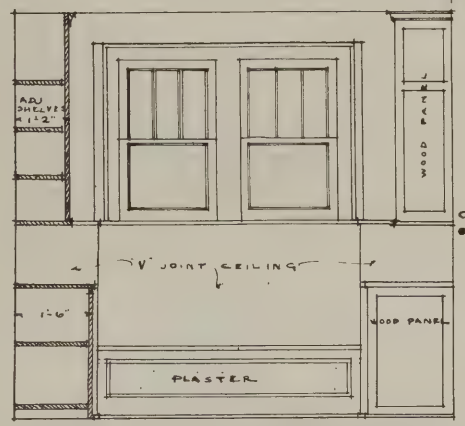
Provide 1⅛-in. screen and storm sash for all exterior openings except ice door unless otherwise noted. Bottom rail of storm sash to have vent.



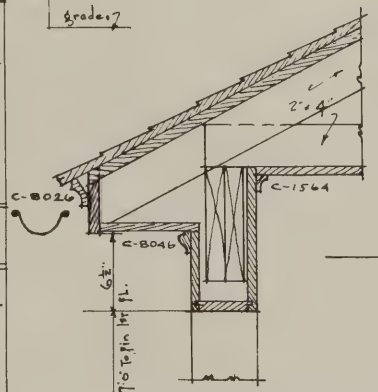
Side and rear elevations of House No. 5A54, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc. Copyrighted by National Builder and The Architects' Small House Service Bureau



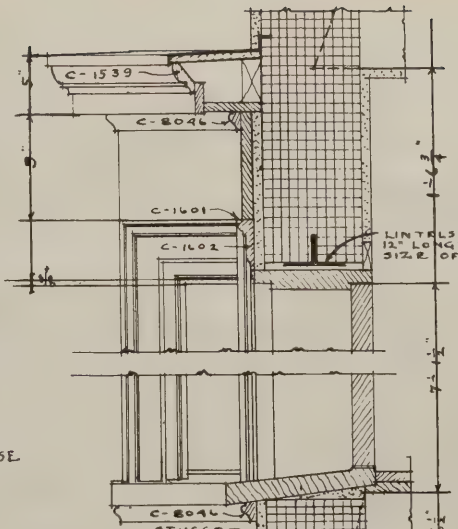
½" SCALE DETAILS OF LINEN CASE



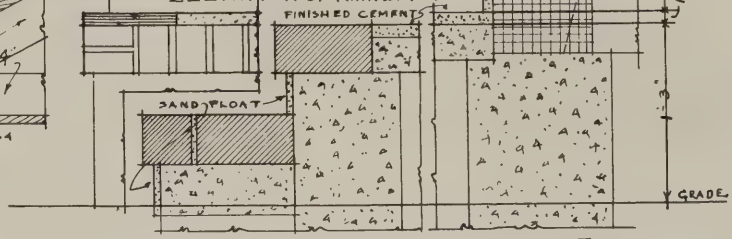
KITCHEN CUPBOARDS
SCALE ½" = 1'-0"



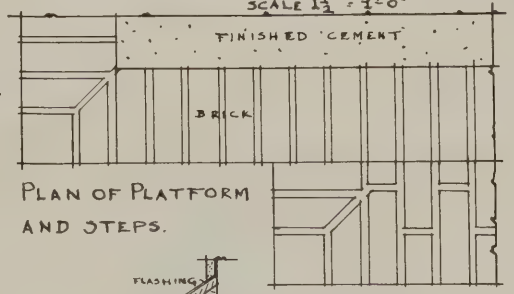
SECTION THRU PORCH CORNICE
Scale 1½"-1'-0"



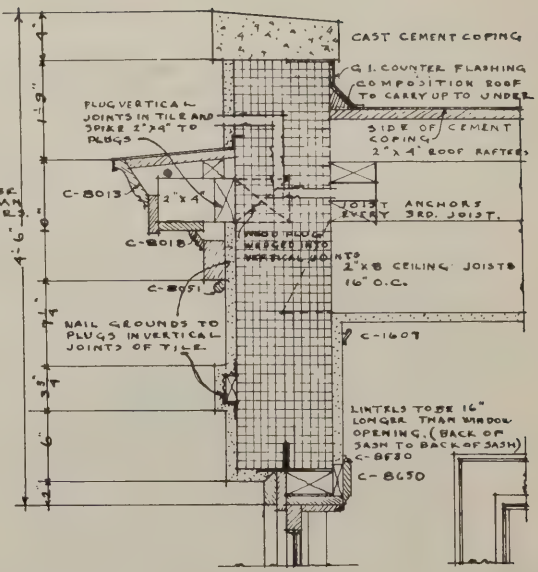
ELEVATION OF MAIN ENTRANCE



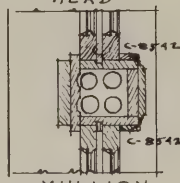
SECTION THRU PLATFORM, STEPS + MAIN ENTRANCE
SCALE 1½" = 1'-0"



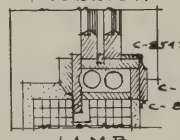
PLAN OF PLATFORM AND STEPS.



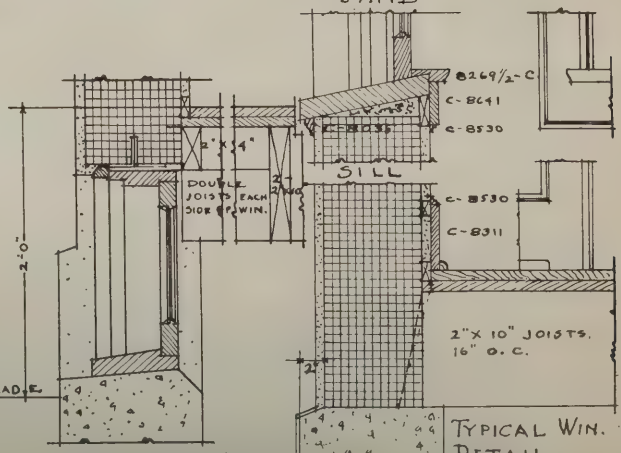
HEAD



MULLION

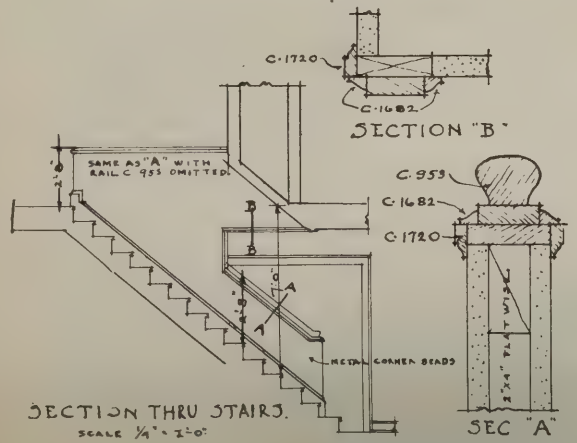


JAMB



BASEMENT WINDOW.

TYPICAL WIN. DETAIL
SCALE 1½" = 1'-0"

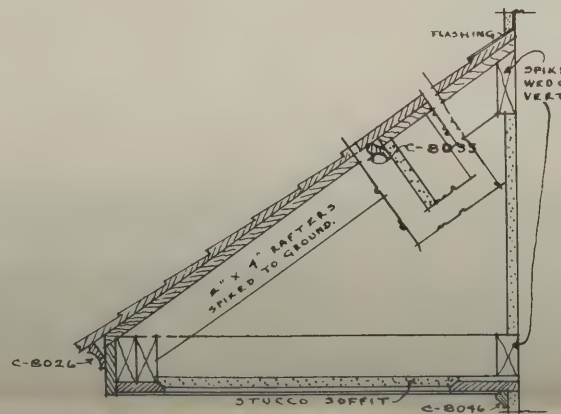


SECTION "B"

SECTION THRU STAIRS.
SCALE ¼" = 1'-0"

SEC "A"

3" SCALE DETAILS OF STAIR



William Watson, Builder

Yonkers, N. Y., Contractor Believes Good Work the Best Advertisement

AN example of a builder who loves his work and whose aim is to build the most attractive rather than the lowest-priced houses is William Watson, Colonial Heights, Yonkers, N. Y. Happening into this district last fall, the editor was struck with the number of attractive houses, and upon inquiring was told that the builder of most of them was William Watson; and everybody knew he had built them. And in one of these houses he lives himself and has a remarkably attractive and cozy little office.

Mr. Watson began his career as a builder while serving as superintendent for a large construction firm. He started, as many builders do, by designing and erecting a single house as a speculation, or rather investment. It was attractive and he speedily sold it and began another.

Being a live wire, he got in close touch with real estate developers and watched new developments of likely possibilities, and when the time was ripe made deals with these real estate firms to erect a few houses on his own capital in their developments to serve as drawing cards for the further upbuilding of the locality. These houses, of course, he soon sold and

William Watson, Builder

houses is usually as follows: He gets title to a lot for a small down payment, erects the house and sells it with a first mortgage financed through the usual channels. Money real estate development as a whole progress with the erection of such attractive houses. A third mortgage is sometimes taken by the builder himself, and held by him to maturity to save the owner excessive discount costs.

Mr. Watson often has the experience of making both plans and estimates which unthinking clients take to other contractors for lower estimates; and not infrequently sees his designs executed by other contractors for less than his estimate. However, he seems to take this cheerfully, and as a matter of course, and frankly says he would rather not undertake to build one of his houses unless he can do it right.

His houses range in cost from $14,000 to $20,000. Two of them are shown in the Style Sheet of this issue.

The second house shown on page 50, following, has an interesting history. The first thing he told the editor in regard to it was: "I made a mistake with this house. I left out a dining room." He had read about space-economizing houses elsewhere and decided to give it a tryout. Unfortunately the class of people he caters to couldn't see a house without a dining room.

This incident illustrates the necessity of knowing thoroughly the tastes and inclina-

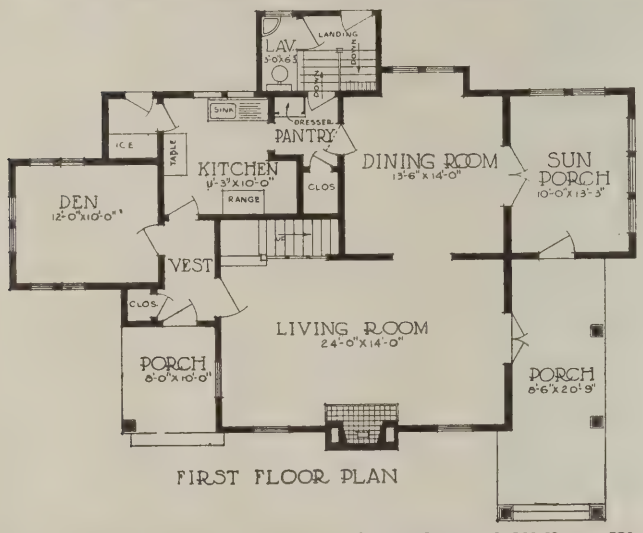
Row of Watson houses, Colonial Heights, Yonkers, N. Y.

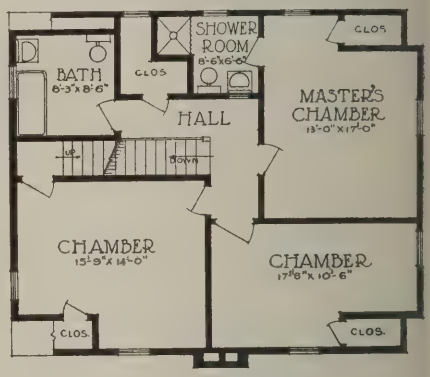
hey were his advertisements as a builder or that community. In this way he has houses in many of the best local suburbs.

Mr. Watson's scheme of financing such for the second mortgage is usually supplied by the original owner of the real estate, who is willing to take the additional risk of a second mortgage in return for seeing his tions of the particular class of people who are settling a suburb. In other parts of the country—indeed in other suburbs of New York—this house would have been ideal.

William Watson's own home at Yonkers, N. Y.

Another view of William Watson's home

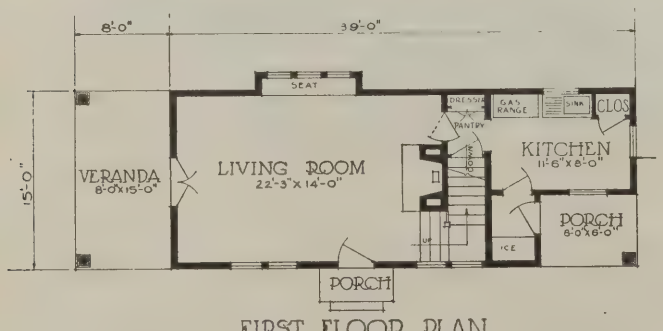


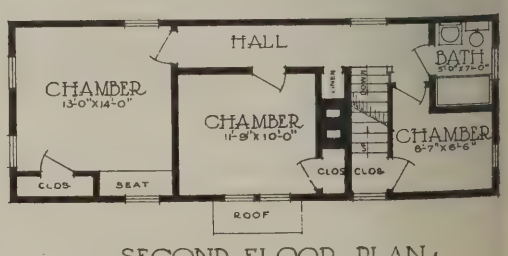


Floor plans of William Watson's own home—the den is his office

Narrow house on Colonial Heights, Yonkers, N. Y.

Unusual construction for cellar bulkhead

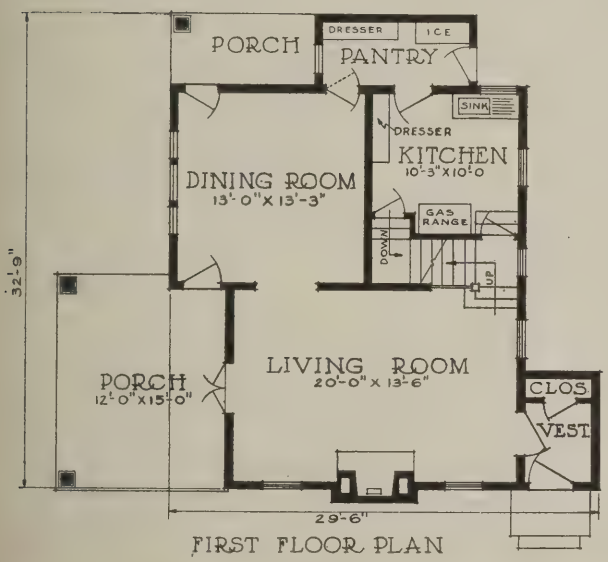




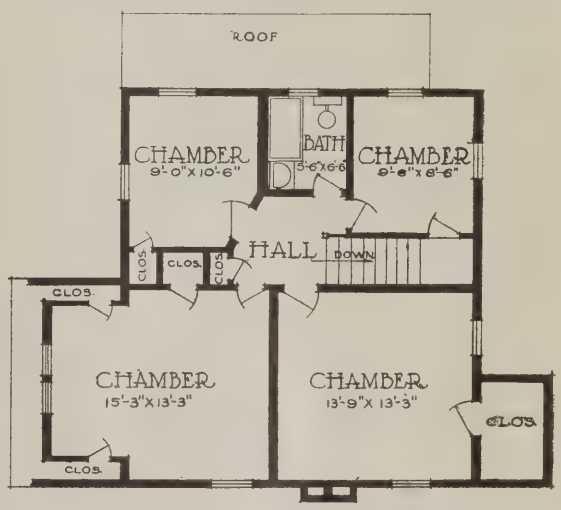
Floor plans of house on Colonial Heights, Yonkers, N. Y., illustrated above

Another home on Colonial Heights, Yonkers, N. Y.

Built-in garage of Yonkers house



FIRST FLOOR PLAN



SECOND FLOOR PLAN

Floor plans of house, Colonial Heights, Yonkers, N. Y., illustrated above

House at Bronxville, N. Y., designed and built by William Watson, showing an unusual type of built-in garage

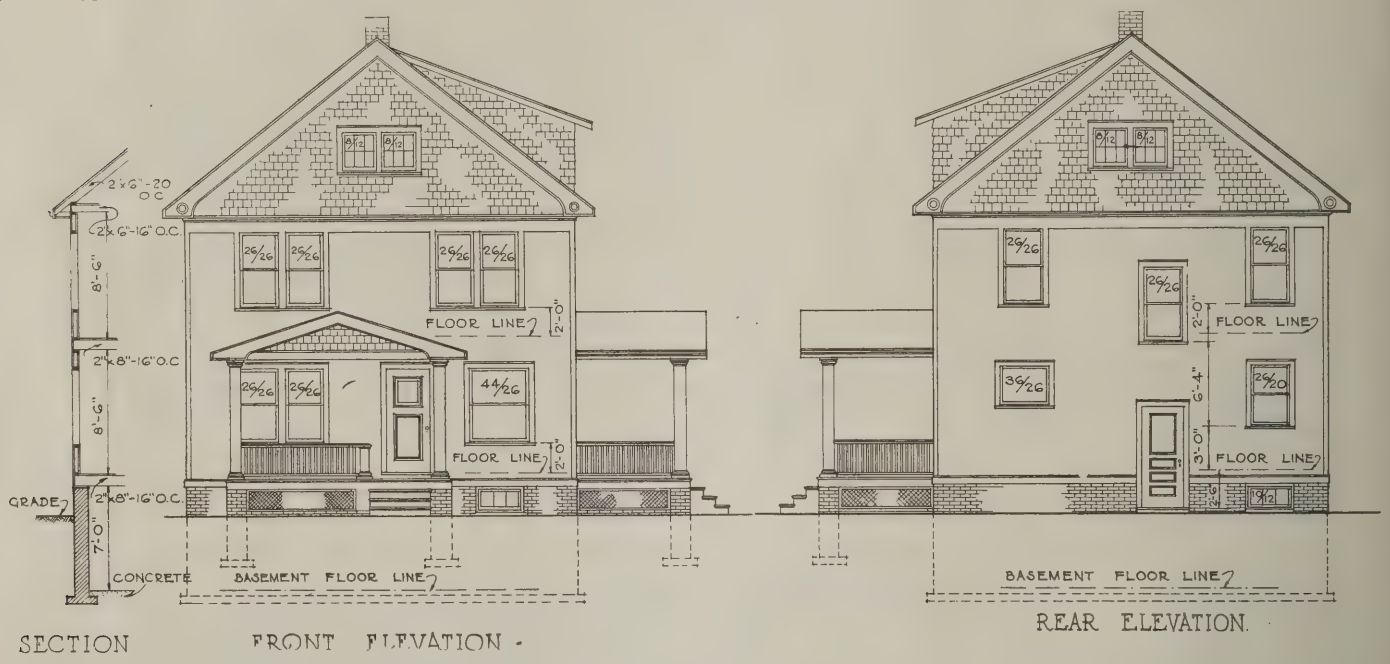
Plans of Two-Family Houses

THERE is a growing demand for two-family houses, and a great change is taking place in their design. It used to be customary in many cities to see street after street of two-family houses of identically the same design and plan. Now some attempt is being made nearly everywhere to give these two-family houses some of the individuality that clients now almost unanimously expect in the single-family home.

Herewith are a number of two-family house designs by Henry W. Grieme, architect, Cleveland, Ohio, which illustrate two general types of two-family houses now being built in Cleveland and suburbs. The first of these, shown on this page, is in the nature of a double-house, with three rooms downstairs and three rooms upstairs for each family. Each family, it will be noticed, also has a separate front entrance porch.

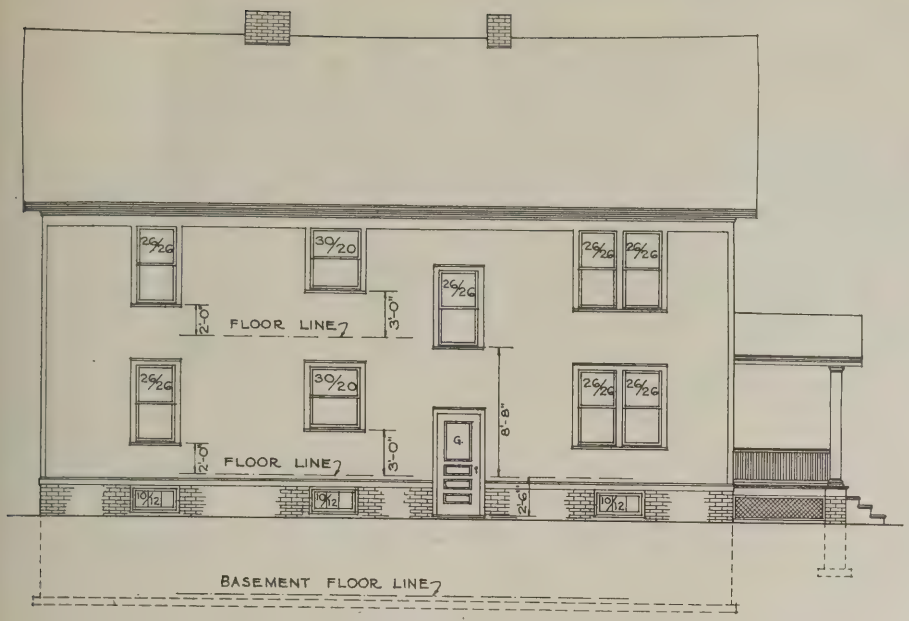
The house shown in design No. 264 is the ordinary two-flat type, planned, however, on a more elaborate scale than usual in this type. Each flat has a very large living room, a sun parlor and a sleeping porch, in addition to a front porch opening out of the living room. It is believed that this design provides all the facilities and comforts demanded by the most fastidious renters and provides also a first-class investment for a well-to-do family which can live in considerable luxury and at the same time have an income-producing home.

The house design No. 296 is a somewhat less elaborate two-flat house of the same general design as the previous one. The arrangement of sun parlor, living room, dining room and porch or balcony is quite unusual and attractive. Both designs are intended to provide a complete home even in a two-family building.

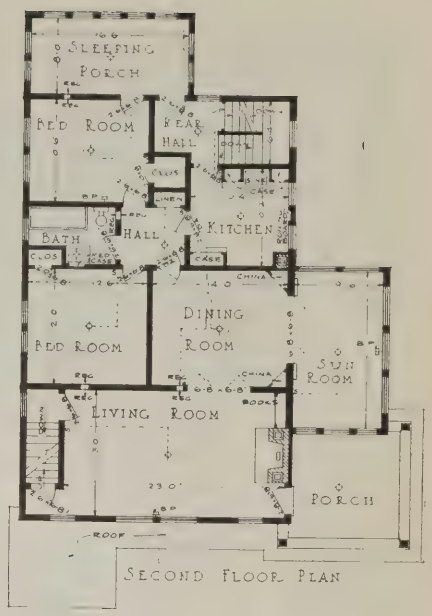


Two-family house design No. 207 by Henry W. Grieme, architect, Cleveland, Ohio

Floor plans of house design No. 207. Note double-house arrangement of rooms



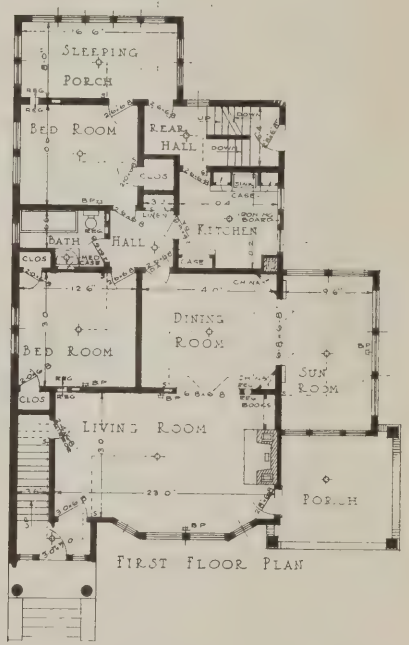
SIDE ELEVATION.



SECOND FLOOR PLAN

SIDE ELEVATION.

Side elevations of two-family house design No. 207

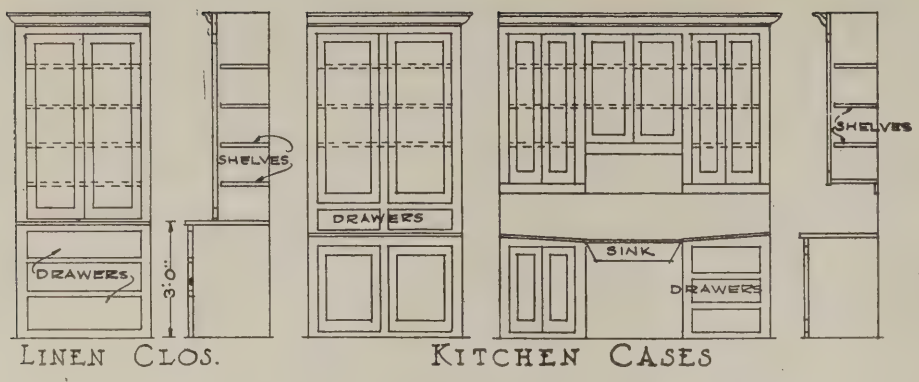


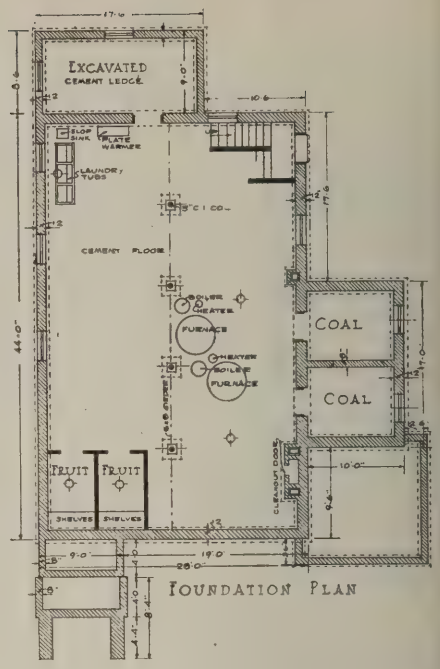
FIRST FLOOR PLAN

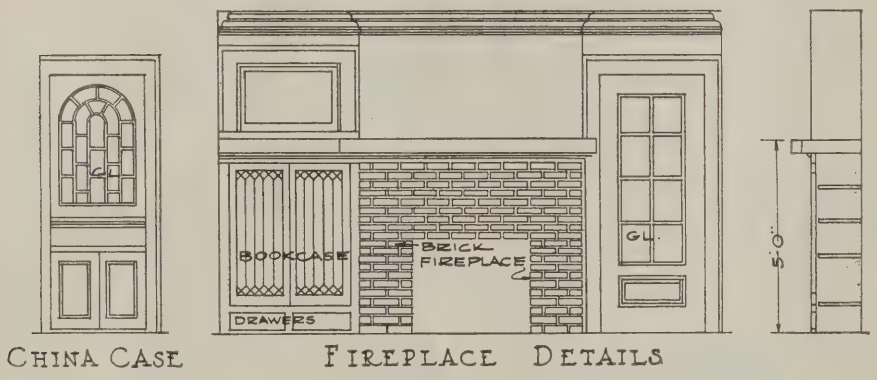
Floor plans of house No. 264

SECTION FRONT ELEVATION SIDE ELEVATION

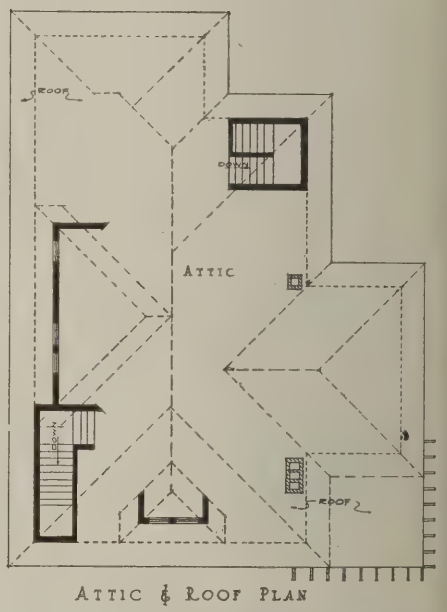
Elevations of two-family house design No. 264 by Henry W. Grieme, architect, Cleveland, Ohio



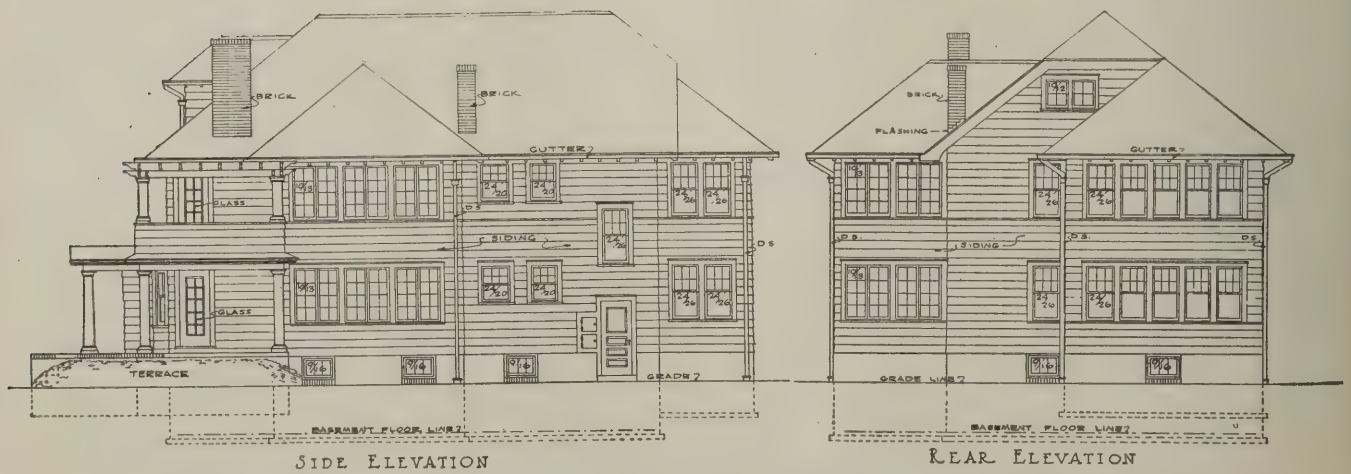




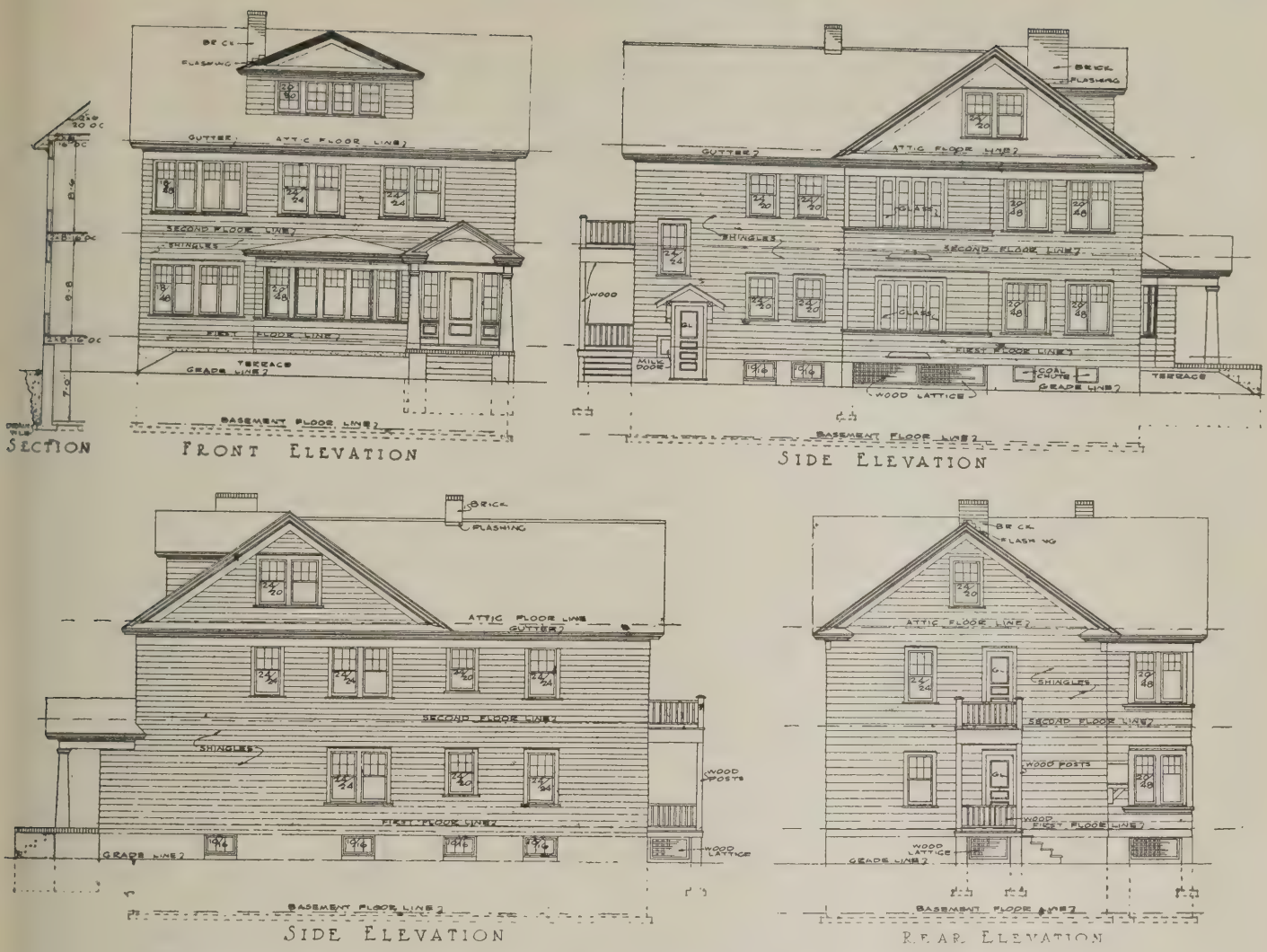
Interior details of two-family house No. 264 by Henry W. Grieme, architect, Cleveland, Ohio



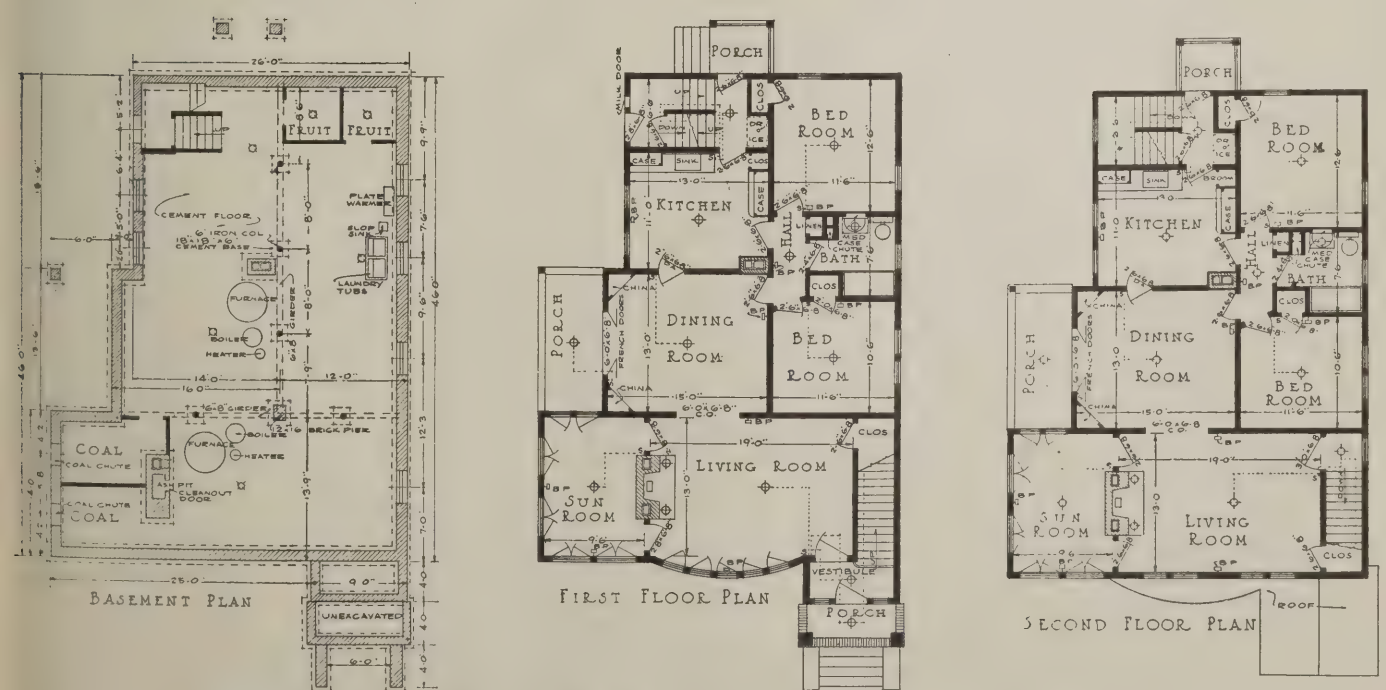
Basement and roof plans of house No. 264



Side and rear elevations of two-family house design No. 264



Elevations of two-family house design No. 296 by Henry W. Grieme, architect, Cleveland, Ohio



Floor plans of two-family house No. 296 by Henry W. Grieme, architect, Cleveland, Ohio

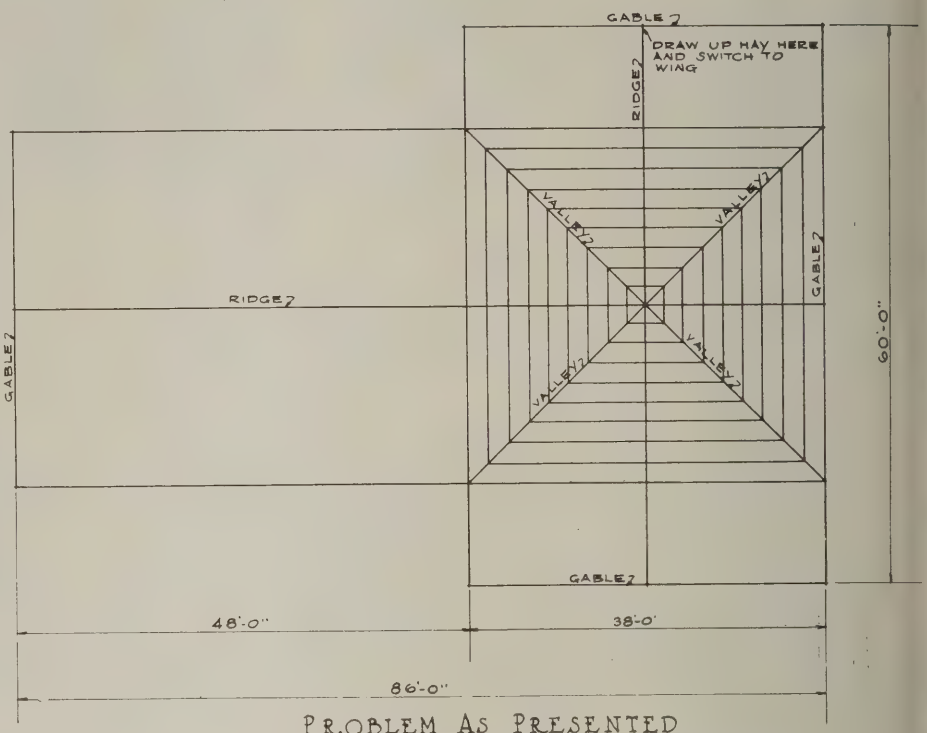
Barn-Framing Details

Roof Design for Barn with Four Valley Rafters to Sustain Hay Carrier

THERE are many agencies where designers and builders of various structures can get assistance in planning their work. NATIONAL BUILDER is one of them; but the function of NATIONAL BUILDER in the construction industry, as the editor and publishers see it, is to serve as a clearing house of information for both builders and manufacturers of equipment and material, for builders and architects, for builders and structural engineers, etc., rather than to enter into competition with these—its readers and advertisers—in rendering engineering and architectural service.

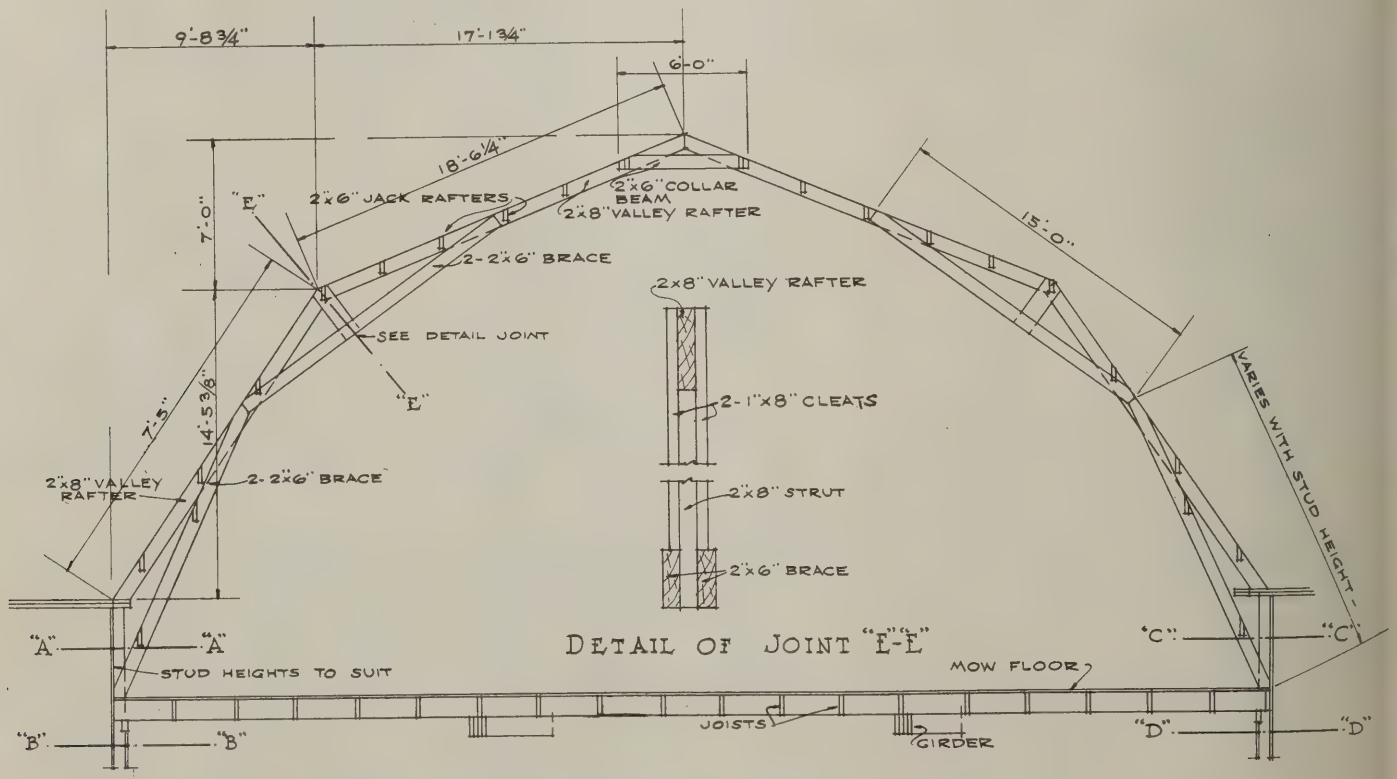
Through the columns of NATIONAL BUILDER it is constantly being shown to readers how to get in touch with the architectural service rendered by such agencies and unassailable authorities as the Architects' Small House Service Bureau of the United States, and with the service bureaus of many trade associations and manufacturers whose principal purpose is to aid builders and users of their materials and equipment.

Many readers, who have occasion to design apartment buildings are not very familiar with the splendid suggestions and



PROBLEM AS PRESENTED

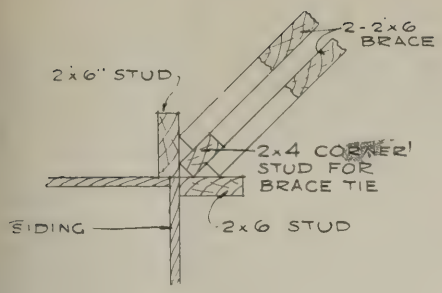
Problem in barn framing submitted by a National Builder reader



DETAIL OF JOINT "E-E"

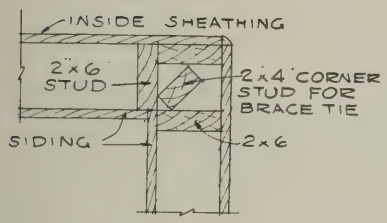
SECTION SHOWING VALLEY RAFTERS

Design for barn frame made by a prominent barn equipment manufacturer



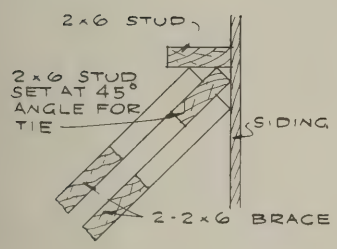
SECTION "A"-"A"

Section through left-hand corner above floor



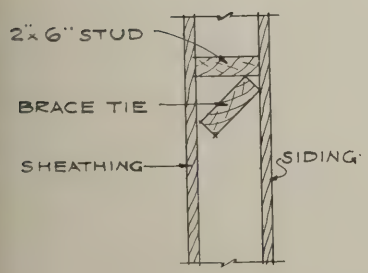
SECTION "B"-"B"

Section through left-hand corner below floor level



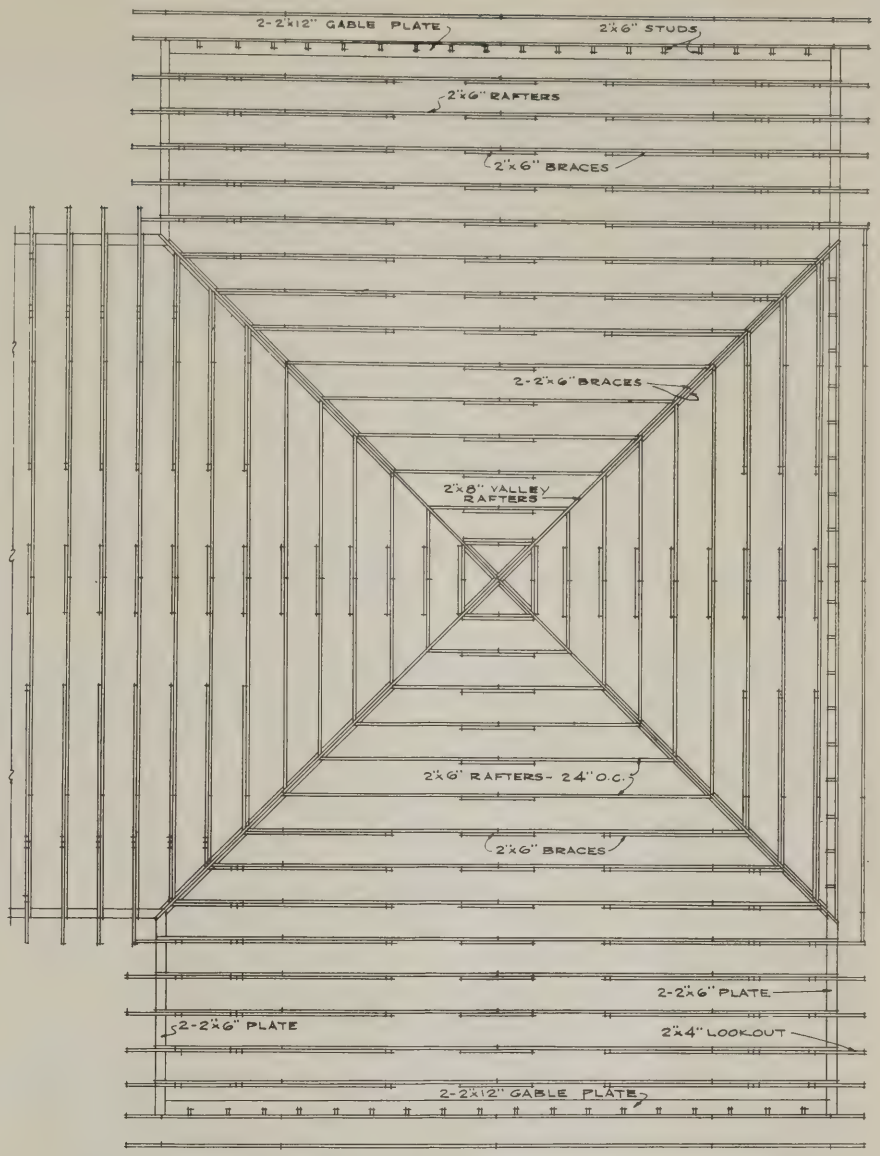
SECTION "C"-"C"

Section through right-hand corner above floor

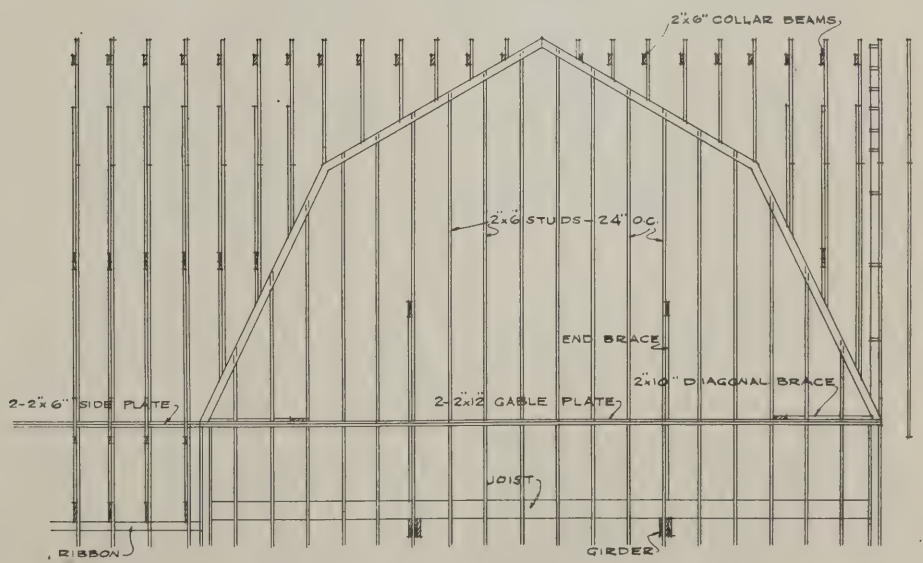


SECTION "D"-"D"

Section through right-hand corner below floor

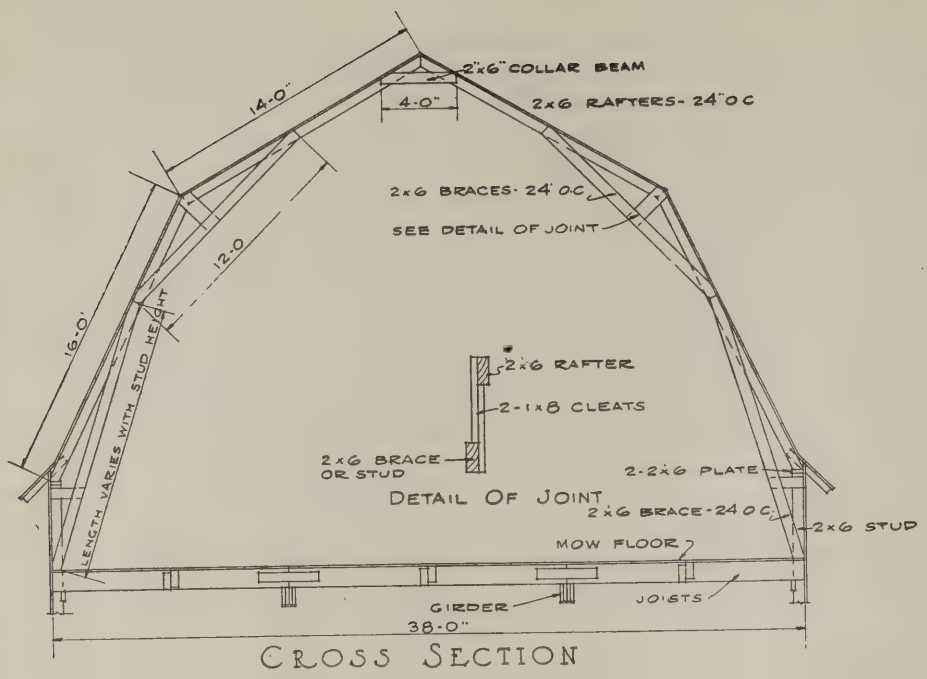


PLAN OF ROOF FRAMING



TYPICAL FRAMING OPPOSITE HAY DOOR END

Details of barn design submitted as solution of reader's problem



Cross-section of barn showing details of trusses

plans they can obtain from such manufacturers as those who make in-a-door beds, kitchen cabinets, etc. Likewise, manufacturers of barn, poultry-house, hog-house equipment, etc., always have many plans and suggestions available for use of professional builders of these structures. NATIONAL BUILDER is ready and willing at all times to bring architects, builders and contractors into touch with such service bureaus; and our readers are urged to send their problems to the editor, who will see that each is submitted to an expert in that particular line.

Helping a Barn Contractor

An example of the way in which such inquiries are handled is the following: An Indiana contractor sends us the problem illustrated herewith. He writes: "The owner wants to install a big hay-carrier system in a barn 38x60 ft., T-shaped, with a wing 38x48 ft. The owner wants a switch, which to my mind, would necessitate a valley at points as designated on my sketch. Will it be safe to throw so much load on these four valleys? It is to be a gambrel roof. Had figured 2x8's for the valleys."

The problem was submitted to the service department of one of the largest barn equipment manufacturers in the world—the Louden Machinery Co., Fairfield, Iowa—who promptly supplied the accompanying design.

The design already decided on, as noted, was a gambrel roof type with valley rafters at the intersection of the T. These valley rafters are shown in section "HH". They are built up of 2 joists, 2x8, and are supported by braces, each made of two 2x6's which are framed to the valley rafters as shown on the plan. The intersection of the valley rafters is held rigid by means of a 2x8 strut, which runs from the intersection to the brace as shown in the detail "EE". The strut is placed between the 2x6's which form the brace and is held fast to the valley rafters by means of a 1x8 cleat nailed on each side of the strut. The rafters are held at the ridge by means of a 2x6 collar beam. All jack rafters are 2x6, with 2x4 for look-outs. The gable plates are made of two 2x12.

The intermediate rafters shown in the cross-section are similar to the above design except that they are single 2x6 and the joint detail is not quite as elaborate. Two 2x6's are used for plates and the rafters are spaced 24 in. on centers.

For the hay carrier a straight track through each section of the T with a turntable at the intersection, which would permit the carrier to be transferred to either section of track is recommended.

Barn Equipment Manufacturer Extends Engineering Service

ONE of the most interesting developments in the farm-building construction industry in recent years is the announcement of the James Manufacturing Co., Fort Atkinson, Wis., that hereafter it will concentrate on farm engineering service. Through the company's new method of sales and distribution it is possible for the local contractor to obtain much helpful engineering assistance in his work for rural customers, for it is the intention of this concern to extend its service to include the design and equipment of farm buildings of every kind from farm house to poultry house.

R. R. Krebs of the company writes to the editor as follows:

"Our ambition has been, and is, not only to manufacture farm-building equipment, but to render to the farmer customer the kind of service that is absolutely inseparable from the equipment if that equipment is to function for him as it should function and can function.

"There is no moral or economic justification in selling a farmer 20 stalls, let us say, if his barn is so arranged that these stalls will not give him relief from unnecessary labor. There is no economy for the farmer in buying a carrier system if he is obliged to go all around Robin Hood's barn in order to use it.

"The dairy farmer, just to pin down our consideration to one type of farming served by our engineers, runs his farm to make money. His factory is the dairy barn. He cannot get his workers—the cows—to produce efficiently if the factory is not right and if their equipment is not right. The cow eats feed to keep up her body and to make milk. To utilize the feed she eats most efficiently, the barn must be constructed properly.

"It stands to reason that men who are planning satisfactory dairy barns every day in the year know more about this subject than the farmer who plans but one. They know how many cubic feet of air a cow needs; how many cubic feet of air she can heat; how much heat is lost through various wall materials; how to build to prevent wet and frosty walls; how to build to secure satisfactory conditions inside the stable during those days of the year when the cows are shut up."

With the object of accomplishing these objects the company will work directly with farmers and contractors instead of through dealers. The announcement states:

Our plans contemplate a rapid readjustment to a program by which we propose to conduct, through trained practical farm service men in the field, a more complete engineering service having to do with practical farming, diversification of crops, better and more intensified dairying, hog and poultry raising, and to guide the farmer in better housing, better care and feeding of his stock to put his operations on a profit basis, assist him with his marketing problems, and thus help him to be a consistent money maker and a better cash customer all around for the many things the dealer has to sell.

Our service man, operating in a small territory—from one to two counties—will be a resident of that community and a patron of and contributor to the business interests properly.

Our educational forces will be constantly engaged in carrying the message of better living, more profitable farming to all communities, with no thought of advertising our own wares, except that we, with the business factors of that community, will profit from the resulting improved methods.

We believe that the farmer is entitled to receive this engineering as we are equipped to render it, without paying the toll that would have to be expected from anyone having a part in the selling who does not have to do very definitely with the execution of it. We feel that fair-minded dealers must agree that they are qualified neither by experience nor opportunity to serve the farmer in an engineering capacity. We believe most dealers will be glad to have this service rendered to their farmer friends.

Merchandising Houses

Publicity for the Builder and How to Obtain It

PUBLICITY is one form of advertising. Publicity is building reputation by ct as well as act. Of course the best ublicity for a contractor or builder is reputation as an honest man, a good orkman and a fair dealer.

Contractors and builders are very apt overlook the advertising and publicity alue of neat and distinctive letterheads nd stationery. They are apt to overlook ne advertising and publicity value of neat nd attractive-looking office buildings. client and prospective client. Much of this can be obtained for the asking and the rest for a nominal charge.

Manufacturers and dealers of building materials also have many schemes for co-operative advertising with builders. By properly co-ordinating his own advertising

by. He can put billboards of attractive design along the public highways. He can get out folders, booklets, circulars or post-cards showing examples of his work. He can use space in the local newspapers—often to great advantage if properly timed and co-ordinated with construction material advertising. And there is the moving picture theater which makes possible the use of special slides; and soon a special film will be available for distribution in which the "own your home" campaign

Samples of letterheads of progressive contractors and builders

ust as a banker has to maintain his pros-erous appearance by wearing good othes and keeping his shoes shined, so contractor or builder must maintain his putation by some outward show of his siness-like ability.

Many builders and contractors overlook ne business opportunities that national anufacturers and large individual manu-cturers offer. Such agencies have mil-ons of dollars worth of interesting litera-re to create buying sentiment, both for se of the contractor himself and his program with that of prominent manufacturers and dealers, the contractor or builder can do much to increase his reputation and his business. To cash in on the fame and good name of a well-known and nationally advertised commodity is good business—exemplified daily by every progressive retail merchant in the land.

There are many ways an ingenious contractor can advertise his work and his business. He can put signs on buildings under construction—attractive signs—as means of catching the eye of the passer-will be extended to every community.

This 5-reel film is being completed by the Atlas Educational Film Co., Oak Park, Ill., at the expense of a number of national associations of building material manufacturers. The distribution of this film will depend to a large extent on local conditions, but in the majority of cases one of the local building supply men, real estate men, builders, the Chamber of Commerce, or others interested will have expressed themselves as desiring to make use of the campaign.

Advertising and Display Methods for the Contractor and Builder

By E. J. Welsh
Clinton, Iowa

MILLIONS of dollars are spent every year for advertising—ten times as much in this country as anywhere else.

Advertising is salesmanship, public notice, or teaching, for advertising is to make known. Just the moment one tries to convey a fact to the mind of another, advertising is engaged in.

There are many forms of advertising, as there are many forms of merchandising. The moment you handle or recommend a product, you advertise it to some degree. Every sales effort is an advertisement of the article offered. Every home you build or remodel is an advertisement for or against the building business. So, if anyone asks you if you advertise, say yes, for you are advertising. You may not be wholly aware of the fact, but you are advertising just the same.

John Wanamaker, who died a short time ago in Philadelphia, was considered the world's greatest retailer. He was termed "the merchant prince," and he made millions from his various department stores. Wanamaker was the first man to put imagination into business, and the first to discover and utilize advertising as the most powerful selling force. As a salesman, it was his principle to show goods to customers under the exact conditions that they were to be used. He furnished rooms and settings of furniture, rugs, china, clothes, etc. He advertised and kept advertising, and his phenomenal success marks the beginning of a new era in retail selling.

The Display Idea for the Contractor and Builder

Today, this idea—advertising and display—has spread to every line of busines

If you can't afford an office by yourself it often pays to share one with a brother craftsman

Women are always interested in labor-and-time-saving kitchens. Here's how one builder injected the building bug into his customers and prospects

Prospective home builders like to see and know before they build. This display of built-in woodwork items increases the builder's profits

es, even to the building business, as is videnced by the pictures on these pages. he bungalow office shown here is the ffice of E. J. Dean and T. D. Gregory, ontractors and builders, of Okmulgee, kla. It is divided into rooms, just like home, and each room has a permanent splay of built-in woodwork. In this dis-ay are a dining alcove, ironing board, irror door, dressing table, tray case, anging closet, French doors, kitchen ombination, fireplace, and different kinds trim and flooring.

This display answers a double purpose was invited to visit the office and see "How to go shopping for a home." A special day was set aside for contractors and builders, and each one was sent a letter inviting him to visit the office on contractor's day. More than a hundred contractors responded to the invitation and expressed surprise and pleasure in what they saw and learned.

Many of these contractors are now using this dealer's office for a salesroom —to interest and sell their building prospects. Through the appeal of the completed home, which a display of woodwork tors and builders. One of these is to advertise in a general way, under your own name. The other is the co-operative campaign—where the builder and dealer advertise jointly. The latter method has been used a great deal during the past few years and will undoubtedly be used again this year, as it has worked out very successfully.

Newspaper advertising, to be profitable and effective, should be carefully planned and followed through. It should follow a definite course, not a haphazard, hit-or-miss plan. A great deal of money can be

Curtis Plan A-614, the Home of Mr. M. J. Finn, Circular Drive, Wildwood
Three New Homes in Beautiful Toledo Subdivisions
If any doubt lingers in your mind about whether Curtis Better Built Homes are "in style," or whether Curtis plans are complete and practical—just go out and see these three houses, which have just been completed in as many of Toledo's subdivisions. They'll convince you.
Are you one of the 10,000 Toledoans who have visited "The Prettiest House in Town," which we built near our office, to demonstrate that beautiful homes don't have to be large, nor cost a barrel of money? Here are three more proofs. Mr. Ketcham's home is built from the same plan as "The Prettiest House in Town;" Mr. Finn's home is also a Colonial house; and Mr. Gillet's home is of the English type. Each one is distinctive, and each one demonstrates what attractive homes can be built from stock plans.
Swing into line! You, too, can have a home like these. Come to our Service Room. Look over the 300 plans we have to offer you without charge. Let us tell you about our Better Built Home proposition. There's a style to suit your ideas, at a price to fit your pocketbook.
GEO. M. STADER
March 1st, 1922.
The D. J. Peterson Lumber Co.,
1606 Clifton St.,
Toledo, Ohio.
Gentlemen:
I have just completed building the third Curtis "Better built Home" for the year. One a model Melrose C-624, I built on Brookside Drive, just north of Sener Road in Ottawa Hills for Mr. E. H. Gillet. A model A-614 for Mr. M. J. Finn, at 260 Circular Drive in Wildwood and a model A-611 for Mr. Valentine Ketcham, on Edgewater Drive, opposite the school at Point Place.
The only reason I bought lumber from you fellows was that the owner of the first one of these homes insisted that you get the business. After that I really found that it was far cheaper in the end to buy ready made sash under cover. I am glad I did of these jobs because that Curtis Architectural woodwork and Bruce Oak Flooring gave just the finishing touch to a building job.
I want to thank you people, and I sure do, for the people I built these homes for are with me in thanking you for the co-operation you gave. I wish you would tell the Curtis people, for me that the complete working drawings furnished free, [illegible] more than covered by reverting to [illegible], whose plans are featured in magazines before, were very easy to follow and there wasn't a hitch in any of the three.
Yours very truly,
George M. Stader
Curtis Plan A-611, the Home of Mr. Valentine Ketcham, Edgewater Drive, Point Place
Curtis Home Melrose A-624, the Home of Mr. E. H. Gillett, Brookside Dr., Ottawa Hills
We're Proud of These Houses and the Owners Are Too
Why should we be proud? Anyone would be proud if he furnished the plans for a real home, with an exterior that was right and an interior that was convenient and space-saving, and handsome. But we did more than that! We supplied Bruce Oak Flooring, and our Shingles, and Peterson's High Grade Lumber, and Curtis Standardized Architectural Woodwork to make those dream-houses come true. We're proud because these three Better Built Homes have been added to Beautiful Toledo through the influence of our "Prettiest House in Town."
These pictures are just a hint. Go see the houses for yourself, some evening, or some Sunday, in Wildwood, and Ottawa Hills and Point Place.
Then come in and let us send for your copy of the Curtis plan book. If now is the time for Mr. Finn and Mr. Ketcham to build, NOW is the time for you to build, too!
CLINTON STREET
Near Oakwood Avenue
THE D. J. PETERSON LUMBER CO.
Home Phone Prospect 627
Bell Phone Forest 2300

Here's a typical newspaper advertisement showing how the contractor and dealer can join forces and bombard the prospective builder with "Build Now" ammunition. Ads of this nature are generally productive and never fail to arouse the interest of building prospects

it helps to visualize the completed home r the prospective home owner, and it en-les the builder to talk "home" in terms a home to his prospects. There are me who think that the display room idea longs wholly to the lumber dealer, but ch is not the case. Of course, if a builder orks entirely with one or two lumber alers, then, he can afford to leave the splay idea to the dealer and use the deal-s display room when an opportunity ises.

Last summer, the writer attended the ening of a new retail lumber yard in a ge Ohio city. This dealer's office is a autiful Colonial home, divided into oms, each room having different items built-in woodwork for the home. A mal opening was held and the public gives an office, these contractors are selling better built homes—selling a better appreciation of good workmanship—and increasing their sales of woodwork and other materials. Some of them advertise in their local newspapers that they will be glad to help any interested prospect to shop for a home at (giving the name of the dealer who has the Colonial home for an office).

Advertising of this nature and co-operation with the lumber dealer, is working out profitably for both parties, and marks the beginning of a new era in the lumber and building business.

Newspaper Advertising

There are two forms of newspaper advertising in common use among contrac-spent on advertising without showing results. On the other hand, a fair amount can be spent at the right time and in the right way and show profitable returns.

We know of one contractor and builder, in a town of less than 20,000 people, who spends a definite per cent of each year's business for advertising. He uses liberal newspaper space during the building season. Slides are used in the picture shows and letters are sent to prospective home-builders. In the newspaper ads, pictures of homes are shown and the floor plans with them. In some ads, prices are given for the cost of building the home advertised, or an estimate of what the materials will cost.

This man is a contractor and builder, but he does not furnish the materials for

his jobs. Usually, he works in co-operation with the same dealer and he knows just what he can build a home for, complete in every detail. His advertising pays him and he is planning a bigger campaign for this year than he has previously used. He expects 1923 to be a very good home-building year—as good as 1922, and maybe better. If advertising and sales promotion work can make it better, it will be better for him, for he believes that the contractor and builder can cash in on advertising the same as any other business man.

The joint advertising campaign, where the builder advertises with the lumber dealer, has worked out very successfully in Toledo, Ohio. A half-page advertisement is shown here, which is one of several ads used by the D. J. Peterson Lumber Co., of Toledo. In this particular ad, a contractor's letter is reproduced. The letter states that the contractor has just finished building the third Peterson home and that work will be started on others at once. Pictures are shown of the three homes which the contractor built and for which the D. J. Peterson Co. furnished the materials. This makes a very effective advertisement and resulted in the sale of other houses which, of course, meant increased business for both the contractor and the dealer.

Price advertising for the builder and contractor is a disputable question among some builders. By price advertising we mean featuring the amount for which a house can be built. Some builders like this sort of advertising. Others do not, preferring to omit all mention of cost an in its place to urge the prospective builde to call and find out the cost of the hous advertised. Both methods have prove successful, for, after all, the most impor tant thing about advertising is advertising meaning, of course, to keep everlastingl at it.

The day of the "card advertiser" is gon The contractor or builder who relies onl on a small card in his paper, which read —John Doe, Contractor and Builder—i giving his advertising competitor an op portunity to get on the inside of the trac and take the cream of the business. Ad vertising and display pays the contracto and builder just as it pays any othe dealer.

Advertising and Sales Methods of a Big Pacific Coast Home-Building Company

By E. G. Peterson
Vancouver, Wash.

ORGANIZED only a year and a half ago, the Matot Construction Co., of Portland, Oregon, now is recognized as one of the largest home-building organizations in the Pacific Northwest, and ha to its credit 124 houses, ranging in pric

Displaying building materials and equipment to advantage in the office of a live-wire Pacific coast builder

from $1850 to $14,000, located in all sections of Portland, and in the outlying suburbs. This is some record, and "there's a reason," or rather, there are several reasons.

The first lies in the personality of the head of the firm, A. J. Matot. For eight years he was in the business of making ready-cut houses, and in his desire to give customers good service went as far east as Salt Lake City to supervise the erection of his houses. But he found that unavoidably there was a waste of time and materials in such houses, and so turned to his new work of building homes by contract. Here the intimate knowledge of lumber, and all the details of construction gained in the eight hard years that went before have proved invaluable in saving overhead, and eliminating waste. Mr. Matot "knows his business," and knows it thoroughly. So true is this that it is a fine selling point to be able to say "it is a Matot-built house."

Satisfied Customer as an Advertisement

During my interview I discovered that Mr. Matot has an ideal in building, and that is to give his clients "value received" for their money. He believes that "the wagging tongue of a satisfied customer" is the best advertisement any business man can have. Nevertheless he uses good space in the local newspapers. So first he starts out to find what the man who comes into his office wants in the way of a house. He hands the customer a questionnaire to be filled out. This has such details as size of lot to be built on; clearing to be done; whether there is to be a cellar; what kind of floors; inside finish desired; whether the walls are to be papered; what built-ins are wanted; whether there is to be a furnace; how much plumbing is to be installed; if there will be a garage, etc.

When this questionnaire is completed (with the help of the building organization), Mr. Matot knows not only all important details of construction, but can on the same blank indicate the cost of each item, and the total. The Matot company uses the cost-plus method, charging a fee of 8 per cent over the cost of actual construction for the plans, supervision, and service a year after the house is completed, and has found it very satisfactory to their customers and to themselves. In the words of their slogan, "Matot method saves time and money."

In his comfortable new quarters in the Morgan Building, Mr. Matot has dozens of photographs showing homes his company has built, and many plans and pictures of homes in different parts of the country, so that if a customer hasn't any very definite ideas about the sort of house he wants, he may be able to pick out one that he likes the general style of. The company employs a staff of architectural draftsmen, who draw up the plans and specifications after the type of home has been selected, or they will develop and detail plans brought in by customers.

Uses Complete Line of Samples

On the walls also there are ingenious racks showing samples of standard hardware and plumbing, pictures of various types of heating apparatus, and built-ins. There are samples of different woods used for interior finishes, and for the floors, whether these are to be hard or soft. The customer may even examine kinds of brick or cement for the exterior, tiling for the fireplace, and notice the superiority of double-wall and double-floor construction over single. And, by the way, the Matot company puts up only well-constructed houses, with insulating felt between walls and between floors.

By means of these samples a customer may choose everything for his home without ever leaving the office of the company, and so save much time, as well as have the benefit of intelligent advice on the matter. It is a feature that should be adopted by other construction companies.

After the building is completed, the owner is handed an affidavit that protects him absolutely from any liens for lumber, or other claims that might be made for labor. This appeals strongly to many who in the past have had to pay such claims after they supposed everything was finished and paid for.

Year's Good Service Guaranteed

This is not all that Mr. Matot does to safeguard not alone his client's interest, but his own. For one year after a house is finished, it is "serviced" free of charge. This applies not only to the original owner, but to any one purchasing the house during the year. It is a splendid argument if you want to sell a "Matot-built" house, for it means that if the roof leaks, if there is water in the cellar, or a door or window sticks, it will be corrected free of charge during the 12 months after the house is completed. In other words, Mr. Matot is willing to stand behind his work, and give the finest possible service to those by whom he is employed. Naturally, this adds to the reputation for excellence in workmanship enjoyed by the company, and is the biggest reason for its success.

The Matot Construction Co. does all the work on its houses, never subletting any part; they have their own superintendent of construction, and their own crews, employing on an average the year around, 56 men. The lots on which "Matot-built" houses are erected must be entirely paid for, and when the house is completed, the payment must be also. The company will help finance by arranging for a building loan, but the customer must possess the difference between that loan and the entire cost of his home.

I had the feeling when I had finished my interview with Mr. Matot that he has adopted for his motto that saying about "a workman who needeth not to be ashamed," for certainly the Matot Construction Co. is built on the solid foundation of honest work honestly done. But there is a further point—it is intelligent work directed by the brains of a man who has himself worked with his hands.

A Builder's Post-Card

REGULAR readers of NATIONAL BUILDER will recall an article in the issue of July, 1922, describing the operations of an enterprising builder in Dallas, Tex., named A. R. Eckert. As noted in that article, Mr. Eckert is one of those builders who believes that good work is the best kind of advertising, but nevertheless he has ways of letting people know that he does good work. One of his methods is shown herewith in the reproduction of a post-card which he sent out to prospective clients and personal friends a few months ago.

Post-card used for advertising purposes by Dallas builder

House design No. 6A49 especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.
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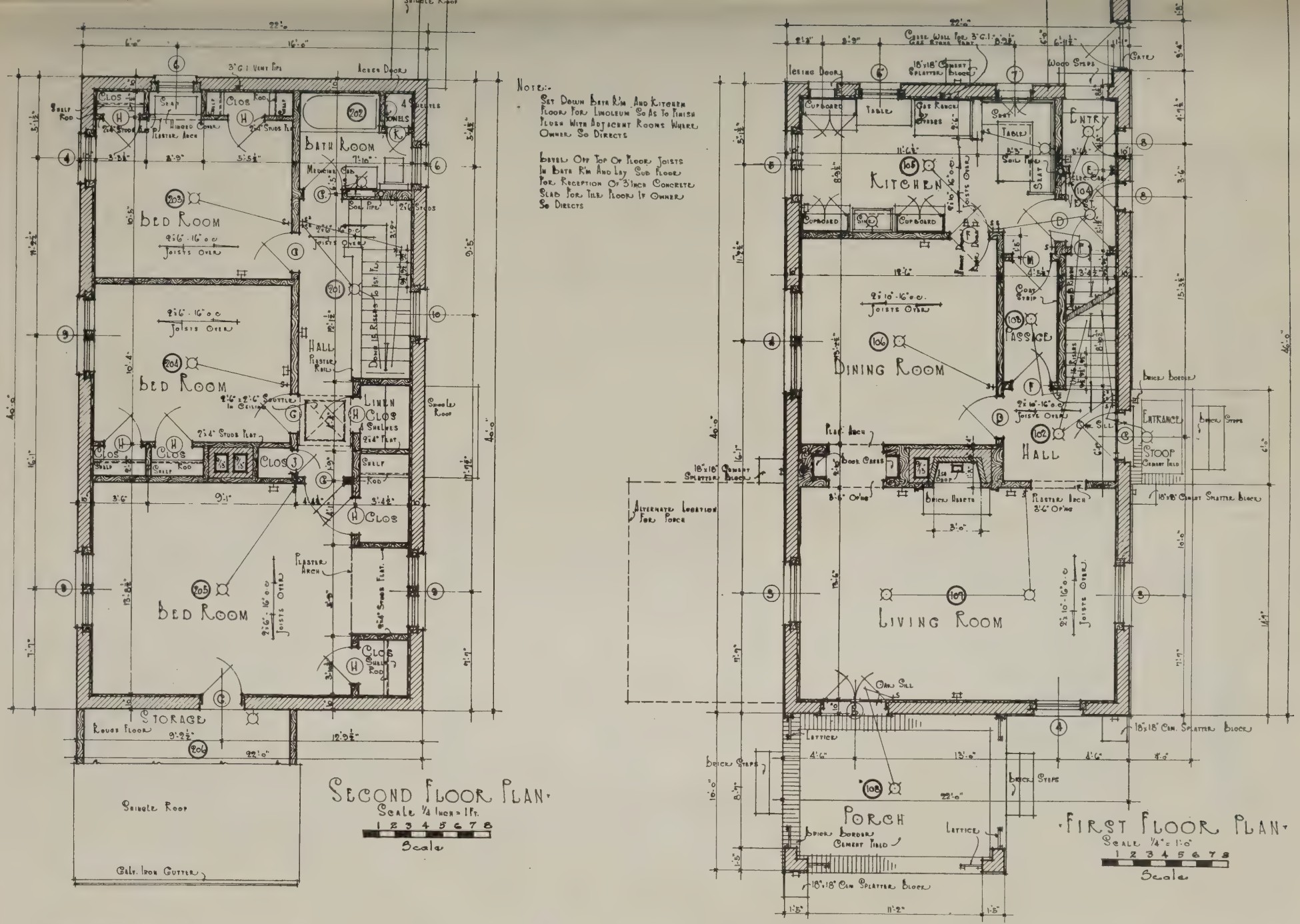


Floor plans of House No. 6A49 designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc. Copyrighted by National Builder and The Architects' Small House Service Bureau

English Style Brick House No. 6A49

THIS is a home of brick in the English style requiring a wide lot. It will need at least 60-ft. frontage for best advantage. If the porch is built at the rear of the living room, instead of at the side, then this house can be accommodated on a 50-ft. frontage. The house is designed to face east or north; and should be reversed for other facings. Reversed plans are provided without extra charge.

Looks are somewhat deceiving in this case, because this is not as large a house as it appears on paper, or will look when actually built. It is very deceptive, because it is a house of greater breadth than depth. The porch at the side and its inclusion under the long line of the roof increase the apparent size of this six-room home.

The windows arranged in an informal manner lend variety and interest to the exterior. And the entrance doorway under its sheltering hood is a characteristic English touch.

The arrangement of the rooms is excellent and will appeal to anyone looking for a six-room home with individuality—a house that will stand apart from others for its beauty and architectural design.

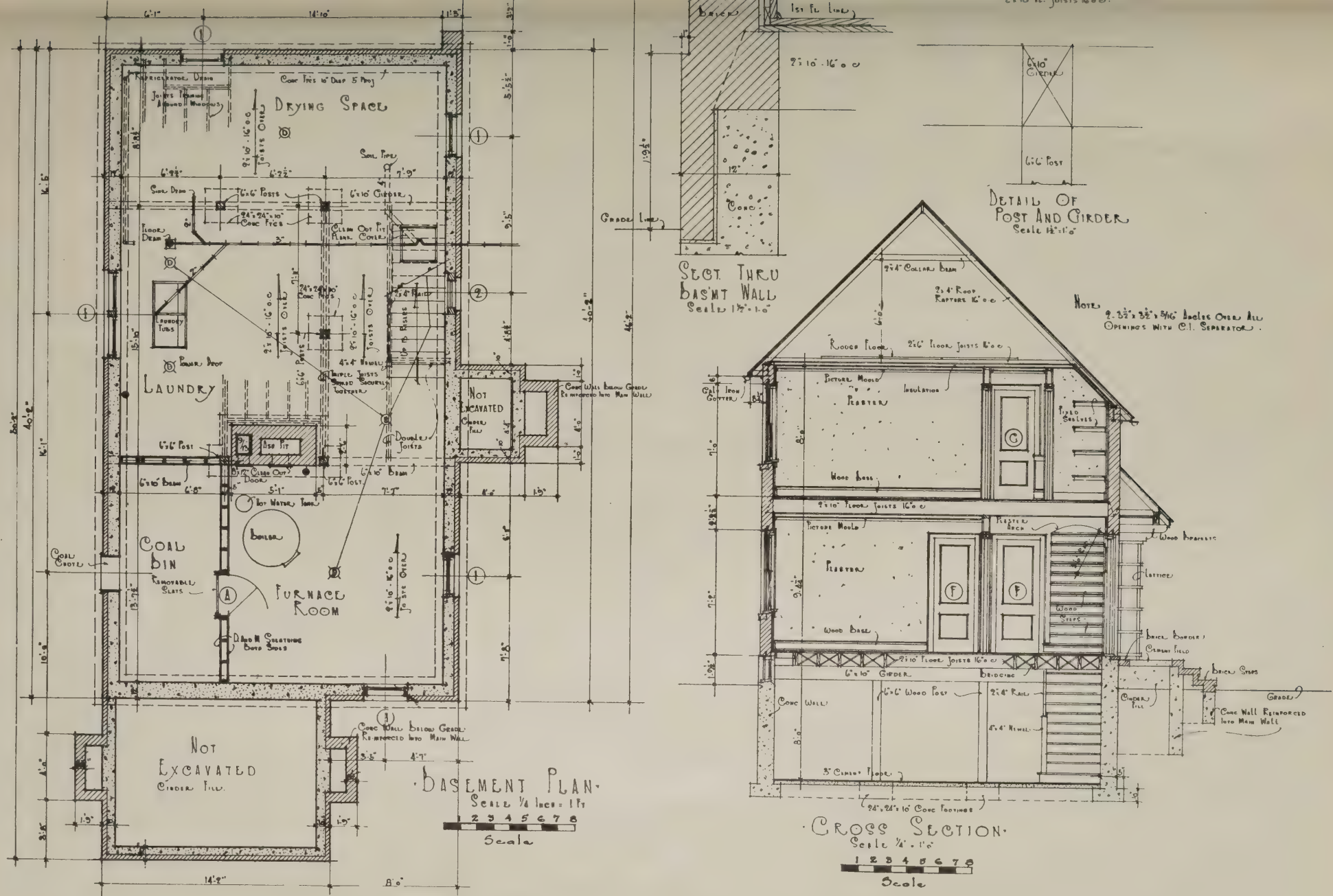
The entrance porch leads to a small entrance hall, on which open the stairs, living room, dining room and passageway to the kitchen. This passageway will also serve as a coat closet and storage room for such things as golf bags, etc. Bookcases are built in beside the living room fireplace, and double French doors lead to the porch.

The kitchen is well lighted and modern in its equipment and arrangement. A modern feature is the breakfast alcove off the kitchen with its built-in corner seat and table.

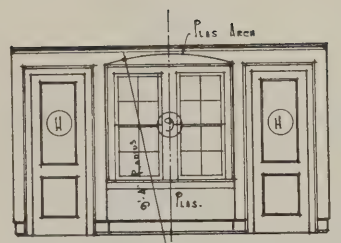
On the second floor there are three bedrooms, bath, linen closet and extra closet for vacuum cleaners or housekeeping supplies. Each bedroom has two closets, a feature that would endear the house at once to almost any woman. The smaller corner bedroom has a charming little built-in seat between the two closets.

The regular price of this plan is $30. Half price to NATIONAL BUILDER subscribers (add 50 cents for postage and packing).

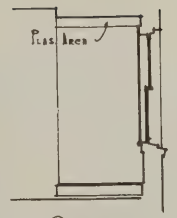
EXCAVATING—200 cu. yd.
BACKFILL—72 cu. yd.
FOUNDATION—If 12" concrete, 60 cu. yd. gravel, 242 sax cement; if 9" concrete, 53 cu. yd. gravel, 214 sax cement; if 12" tile, 28900 CBM tile, 21 cu. yd. mortar; if 9" tile, 26200 CBM tile, 18 cu. yd. mortar.
FACE BRICK—15,000 face brick; 900 lb. mortar color; 11 cu. yd. mortar.
COMMON BRICK OR TILE—20,000 common brick; 15 cu. yd. mortar.
CEMENT FLOOR—7 cu. yd. gravel; 5 cu. yd. sand; 73 sax cement; 5 cement spatter blocks.
CHIMNEY—3000 common brick; 240 face brick; 100 fire brick; 18 sq. ft. hearth tile; 140 inside face brick; 64 lin. ft. 8x12 flue tile; 20 lb. fire clay; 3 cu. yd. mortar; 1 cast-iron ash dump; 1 throat and damper; 1 angle 4x3x5/16-4'0"; 2—8x12 cleanout doors; 1—8" thimble; 2—6" thimbles; 6 yd. metal lath.
LATH—9 sq. yd. metal over boiler; 11,000 wood lath.
PLASTER—9 sq. yd. plaster on metal; 780 sq. yd. plaster on wood; 14 sq. yd. Keene's cement.
TILE FLOORS—42 sq. ft. ceramic tile; 23 lin. ft. cove base.
CINDER FILL—7½ cu. yd.
LUMBER—5—6x6-7 posts; 1—6x10-22 girder; 1—6x10-16 girder; 60 lin. ft. 2x4 basement partition plates; 12—2x4-7 basement partition studs; 400 ft. D&M basem't partition sheathing, 2 sides; 18—2x10-10 first-floor joist; 18—2x10-16 first-floor joist; 18—2x10-14 first-floor joist; 3—2x10-16 girder; 2—2x10-10 doubles under partitions; 2—2x10-16 doubles under partitions; 2—2x10-14 doubles under partitions; 6—2x10-16 headers; 300 lin. ft. 1x4 bridging; 4 ft. 2" plank cleanout cover; 3—2x10-14 stair horses; 900 ft. com. bds. first-floor subfloor; 1140 ft. 13/16x1½ first-floor finish floor; 240 lin. ft. 2x4 first-floor partition plates; 70—2x4-9 first-floor partition studs; 4—2x10-16 stair horses; 18—2x10-16 second-floor joist; 18—2x10-10 second-floor joist; 13—2x10-22 second-floor joist; 4—2x10-16 second-floor joist headers; 2—2x10-16 second-floor joist doubles; 2—2x10-10 second-floor joist doubles; 2—2x10-22 second-floor joist doubles; 900 ft. com. bds. second-floor subfloor; 1140 ft. 13/16x1½ second-floor finish floor; 384 lin. ft. 2x4 second-floor partition plates; 112—2x4-8 second-floor partition studs; 1200 lin. ft. grounds; 116—1x2-16 wall stripping; 30—2x4-14 lookouts; 3—2x10-16 second-floor stair horses; 2—2x8-7 porch girders; 2—2x8-6 porch girders; 5—2x4-3 porch ceiling joist; 4—2x10-10 porch girders; 2—2x10-12 porch girders; 12—2x6-10 porch ceiling joist; 18—2x6-16 second-floor ceiling joist; 21—2x6-22 second-floor ceiling joist; 4—2x6-14 headers; 6—2x4-16 gable studs; 900 ft. D&M attic floor; 8—2x4-5 rafters; 12—2x4-14 rafters; 31—2x4-7 collar beams; 62—2x4-16 rafters; 40 lin. ft. 1x8 ridge rafter; 4—2x6-22 hip rafters; 2—2x4-16 valley rafters; 2450 ft. com. bds. roof sheathing; 17¾ M shingles; 60 ft. shiplap siding; 80 ft. siding; 120 lin. ft. 2x8 wall plates; 25—2x4-16 scaffold, etc.; 25—2x6-14 scaffold, etc.; 8—2x10-12 scaffold, etc.; 12—2x8-16 scaffold, etc.; 200 ft. ceiling for porches.
MILLWORK—Frames: 4 single 8x10-3L-1¾; 1 mul. 8x10-3L-1¾; 1 wd. 10x16-4L-1⅜; 2 wd. 10x12-16L-1⅜; 2 wd. 10x12-12L-1⅜; 1 mul. 10x12-12L-1⅜; 1 mul. 8x10-8L-1⅜; 3 single 8x10-12L-1⅜; 1 single casement 8x10-3L-1¾; 2 single casements 8x10-6L-1¾; 3 mul. wd. 10x12-8L-1⅜; 1 single wd. 10x12-12L-1⅜ with tr 10x12-3L-1⅜; 2 louvre. **Windows:** 6 sash 8x10-3L-1¾; 1 wd. 10x16-4L-1⅜; 2—10x12-16L-1⅜; 4—10x12-12L-1⅜; 2—8x10-8L-1⅜; 3—8x10-12L-1⅜; 1 casement 8x10-3L-1¾; 2 casement 8x10-6L-1¾; 6 wds. 10x12-8L-1⅜; 1 wd. 10x12-12L-1⅜; 1 transom 10x12-3L-1⅜; 2 louvre sash. **Storm Sash:** 6—8x10-3L-1⅛; 1—10x16-4L-1⅛; 2—10x12-16L-1⅛; 4—10x12-12L-1⅛; 2—8x10-8L-1⅛; 3—8x10-12L-1⅛; 1—8x10-3L-1⅛; 2—8x10-6L-1⅛; 6—10x12-8L-1⅛; 1—10x12-12L-1⅛; 1—10x12-3L-1⅛; 2 louvre st. sh. **Screens:** 6—8x10-3L-1⅛; 1—10x16-4L-1⅛; 2—10x12-16L-1⅛; 4—10x12-12L-1⅛; 2—8x10-8L-1⅛; 3—8x10-12L-1⅛; 1—8x10-3L-1⅛; 2—8x10-6L-1⅛; 6—10x12-8L-1⅛; 1—10x12-12L-1⅛; 1—10x12-3L-1⅛; 2 louvre screens 1⅛. **Shutters:** 1 pr. for 8x10-12L-1⅛; 4 pr. for 10x12-12L-1⅛; 2 pr. for 10x12-16L-1⅛; 6 pr. for 10x12-8L-1⅛; 1 pr. for 10x12-12L with tr. 1⅛; 2 pr. for 8x10-6L-1⅛; 2 pr. for 8x10-8L-1⅛. **Outside Door Frames:** 1 double 4'0"x7'0"-1¾; 1 icing door; 1 door 3'0"x7'0"-1¾; 1—2'8"x7'0"-1¾. **Outside Doors:** 2—2'0"x7'0"-1¾ (1600); 1 icing door; 1—3'0"x7'0"-1¾ (1246); 1—2'8"x7'0"-1¾ (970). **Storm Doors:** 1 pr. opening 4'0"x7'0"-1⅛; 1—3'0"x7'0"-1⅛; 1—2'8"x7'0"-1⅛. **Screen Doors:** 1 pr. opng. 4'0"x7'0"-1⅛; 1—3'0"x7'0"-1⅛; 1—2'8"x7'0"-1⅛. **Outside Millwork:** 200 lin. ft. cornice; 34 lin. ft. porch facia; 8 lattice frames 1'6"x8'0"; 16 lin. ft. porch lattice; 60 lin. ft. ceiling cove for porches; 1 wood gate; 1 set of steps; 2 wood brackets. **Interior Doors:** 1—2'8"x6'6"-1⅜ (720); 2—2'8"x7'0"-1⅜ (1102); 3—2'6"x7'0"-1⅜ (1102); 5—2'6"x6'10"-1⅜ (1102); 7—2'4"x6'10"-1⅜ (1102); 1—1'6"x6'10"-1⅜ (1102); 1—1'4"x6'0"-1⅜ (1102); 1—1'6"x2'0"-1⅜ (1 panel); 1—2'6"x7'0"-1⅜ (1212). **Jambs:** 1—2'8"x6'6"; 2—2'8"x7'0"; 3—2'6"x7'0"; 5—2'6"x6'10"; 7—2'4"x6'10"; 1—1'6"x6'10"; 1—1'4"x6'0"; 1—1'6"x2'0"; 1—2'6"x7'0". **Interior Trim:** 4 sides single trim 8x10-3L; 1 side mul. 8x10-3L; 1 side single 10x16-4L; 2 sides single 10x12-16L; 2 sides single 10x12-12L; 1 side mul. 10x12-12L; 1 side mul. 8x10-8L; 3 sides single 8x10-12L; 1 side casement 8x10-3L; 2 sides casement 8x10-6L; 3 sides mul. 10x12-8L; 1 side single 10x12-12L with tr. 10x12-3L; 2 sides louvre; 1 side door 4'0"x7'0"; 1 side icing door trim; 1 side door trim 3'0"x7'0"; 1 side door trim 2'8"x7'0"; 1 astragal for 7'0"-1¾ door; 2 sides trim 2'8"x6'6"; 4 sides 2'8"x7'0"; 6 sides 2'6"x7'0"; 10 sides 2'6"x6'10"; 14 sides 2'4"x6'10"; 2 sides 1'6"x6'10"; 2 sides 1'4"x6'0"; 2 sides 1'6"x2'0"; 2 sides 2'6"x7'0"; 1 flight basement stairs with rail; 1 flight main stairs with rail; 1 flight attic stairs with rail; 2 bookcases; 1 mantel shelf; 2—3'0" kitchen cupboards; 1—3'6" kitchen cupboards; 1—3'8" kitchen table; 1—9'0" corner seat; 1—4'0" breakfast table; 1 meter cabinet; 1 scuttle door; 1 scuttle door jamb; 1 scuttle door trim; 1—3'6" alcove seat; 1 utility door; 1 utility door jamb; 1 utility door trim; 1 medicine cabinet; 30 lin. ft. closet shelving; 30 lin. ft. closet hook strip; 30 lin. ft. closet clothes rod; 590 lin. ft. base; 590 lin. ft. base shoe; 590 lin. ft. base molding; 124 lin. ft. ceiling cove; 290 lin. ft. picture molding; 30 lin. ft. band molding; 12 lin. ft. threshold. **Note:** If trim in dining and living room and hall is changed, it will affect the following items included above: 2 doors 2'0'x7'0"-1¾ (1600); 1 side trim 4'0"x7'0"; 1 door 3'0"x7'0"-1¾ (1246); 1 side trim 3'0"x7'0"; 2 doors 2'6"x7'0"-1⅜ (1102); 2 jambs 2'6"x7'0"; 2 sides trim 2'6"x7'0"; 1 door 2'8"x7'0" (1102); 1 jamb 2'8"x7'0"; 2 sides trim 2'8"x7'0"; 1 set main stairs; 1 mantel shelf; 2 bookcases; 1 side mul. trim 10x12-12L; 2 sides single trim 10x12-16L; 1 side single trim 10x12-12L; 124 lin. ft. ceiling cove; 136 lin. ft. picture molding; 120 lin. ft. base; 120 lin. ft. base shoe; 120 lin. ft. base molding; 750' 13/16x1½ finish flooring. **Tinwork:** 38 lin. ft. ridge roll; 4 finials; 86 lin. ft. hip roll; 12 lin. ft. chimney flashing; 40 lin. ft. valley tin; 15 sq. ft. tin deck; 94 lin. ft. gutter; 14 gutter ends; 5 nipples; 5 strainers; 5 offsets; 5 shutoffs; 5 elbows; 30 gutter hangers; 84 lin. ft. conductor; 16 conductor hooks; 350 tin shingles; 60 lin. ft. flashing tin.
HARDWARE—6 cellar sash sets; 19 sash locks; 19 sash lifts; 3 casement sash sets; 1 transom set; 31 storm sash sets; 31 screen sets; 18 sets of shutter hardware for pairs; 1 gate set with hinges; 1 double door set with butts; 1 icing door set with butts; 1 front door set with butts; 1 rear door set with butts; 1 storm door set for pair of doors; 1 screen door set for pair of doors; 2 storm door sets; 2 screen door sets; 1 floor hinge; 2 push plates; 21 inside door sets with butts; 26 door bumpers; 3 doz. clothes hooks; 4 stair rail brackets; 570 lb. sash weights; 4 hanks sash cord; 1300 lb. assorted nails; 6 lb. assorted brads; 1 coal chute; (kitchen cabinets: 10 pr. ornamental butts; 5 cupboard turns; 5 elbow catches; 4 drawer pulls; 1 bin pull; 1 set bin balances; 3 pr. ornamental butts; 2 cupboard turns; 1 elbow catch; 2 drawer pulls); 1 pr. hinges for seat; (meter cabinet: 1 pr. ornamental butts; 1 cupboard turn); 1 pr. hinges for scuttle door; 4 friction stays utility door; (medicine cabinet: 1 pr. ornamental butts; 1 cupboard turn); 36—½" bolts 12" long with nuts and washers.
STRUCTURAL STEEL—164 lin. ft. 3½x3½x5/16 angles.
REINFORCING STEEL—38—⅜ rods, 10'0"; 10—½ rods, 13'; 14—⅜ rods, 6'; 6—½ rods, 7'.
EXTERIOR PAINTING—54 gal. shingle stain; 4 gal. trim paint; 1 gal. oil; 2 gal. turpentine; 1 gal. sash color; 1 gal. screen paint; ½ gal. shutter paint; 1 gal. Japan; 6 doz. sheets sandpaper; 5 lb. putty; ½ gal. lattice paint.
INTERIOR PAINTING—13 gal. white paint; 8 gal. enamel; 6 gal. filler stain; 3½ gal. shellac; 14 gal. interior varnish; 4 gal. floor shellac; 7 gal. floor varnish; 3 gal. oil; 1 gal. Japan; 1 gal. turpentine; 1 gal. alcohol; 3 lb. steel wool; 4 doz. sheets sandpaper.
WEATHER STRIPS—6 sash 8x10-3L; 1 wd. 10x16-4L; 2 wd. 10x12-16L; 4 wd. 10x12-12L; 2 wd. 8x10-8L; 3 wd. 8x10-12L; 1 casement 8x10-3L; 2 casement 8x10-6L; 6 wd. 10x12-8L; 1 wd. 10x12-12L; 1 transom 10x12-3L; 2 doors 2'0"x7'0"; 1 door 3'0"x7'0"; 1 door 2'8"x7'0".
CAULKING—18 single frames; 6 mul. frames; 1 double door frame; 2 single door frames; 1 icing door frame; 1 coal chute.
INSULATION—800 ft. flaxlinum or equal ceiling; 1600 ft. flaxlinum or equal outside walls; 3 rolls felt for floors; 5 rolls felt for roof.



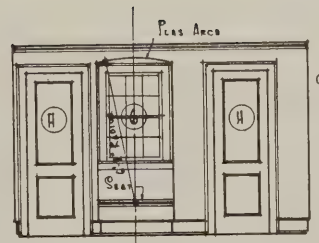
Basement plan and cross-section of House No. 6A49 designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc. *Copyrighted by National Builder and The Architects' Small House Service Bureau*



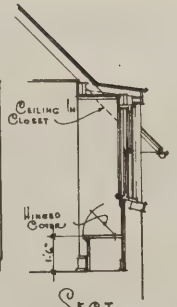
ELEV. OF BED ROOM No 205
Scale ¼"=1'-0"



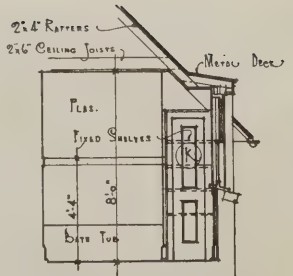
SECTION



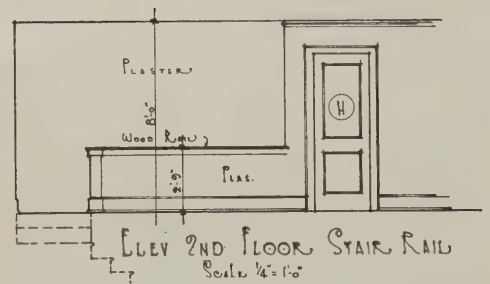
ELEV. OF BED ROOM No. 203
Scale ¼"=1'-0"



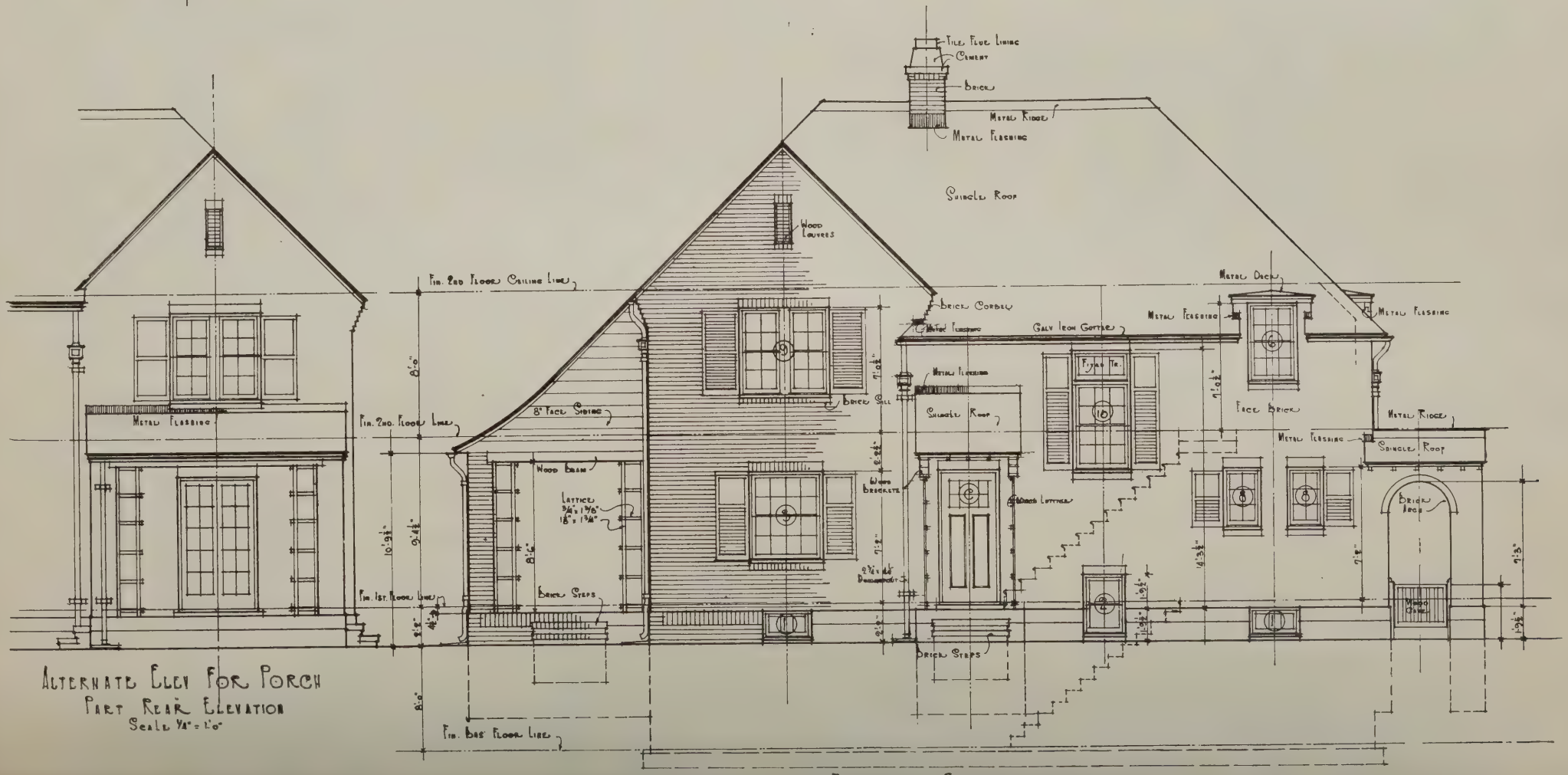
SECT.



ELEV. OF BATH ROOM.
Scale ¼"=1'-0"



ELEV 2ND FLOOR STAIR RAIL
Scale ¼"=1'-0"



ALTERNATE ELEV FOR PORCH
PART REAR ELEVATION
Scale ¼"=1'-0"

·FRONT ELEVATION·

Front elevations of House No. 6A18 designed especially for NATIONAL BUILDER *by the Northwestern division of The Architects' Small Homes Service Bureau of the United*

Foundation walls shown concrete may be stone, brick, concrete block or load-bearing hollow tile.

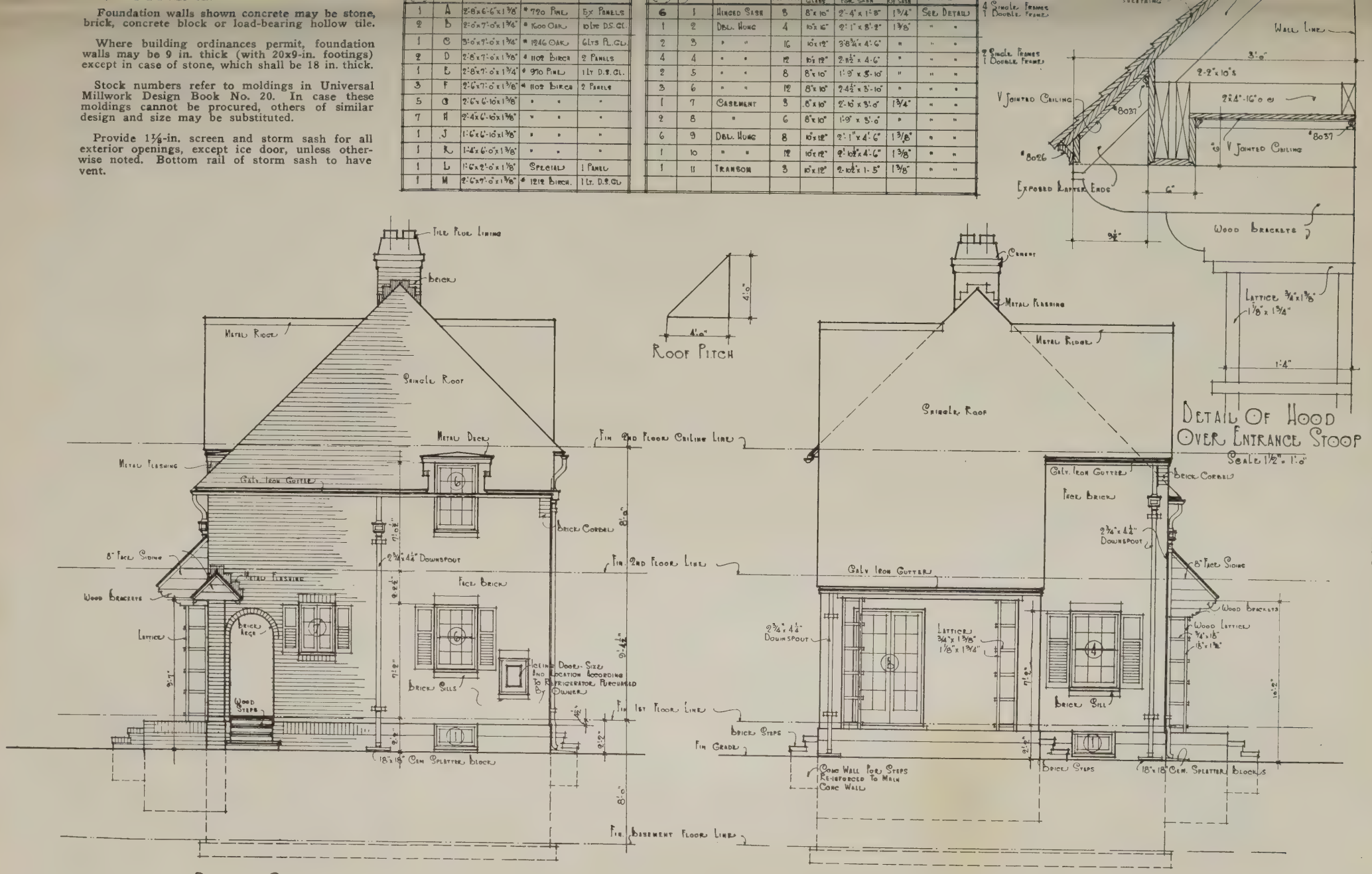
Where building ordinances permit, foundation walls may be 9 in. thick (with 20x9-in. footings) except in case of stone, which shall be 18 in. thick.

Stock numbers refer to moldings in Universal Millwork Design Book No. 20. In case these moldings cannot be procured, others of similar design and size may be substituted.

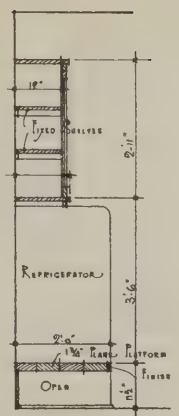
Provide 1⅛-in. screen and storm sash for all exterior openings, except ice door, unless otherwise noted. Bottom rail of storm sash to have vent.

1	A	2'-8"x6'-6"x1⅜"	* 720 Pine	5x Panels	
2	B	2'-0"x7'-0"x1¾"	* 1600 Oak	10 Lts D.S. Gl.	
1	C	3'-0"x7'-0"x1¾"	* 1246 Oak	6 Lts Fl. Gl.	
2	D	2'-8"x7'-0"x1⅜"	* 1107 Birch	2 Panels	
1	E	2'-8"x7'-0"x1¾"	* 970 Pine	1 Lt. D.S. Gl.	
3	F	2'-6"x7'-0"x1⅜"	* 1102 Birch	2 Panels	
5	G	2'-6"x6'-10"x1⅜"	" "	"	
7	H	2'-4"x6'-10"x1⅜"	" "	"	
1	J	1'-6"x6'-10"x1⅜"	" "	"	
1	K	1'-4"x6'-0"x1⅜"	" "	"	
1	L	1'-6"x2'-0"x1⅛"	Special	1 Panel	
1	M	2'-6"x7'-0"x1⅜"	* 1218 Birch	1 Lt. D.S. Gl.	

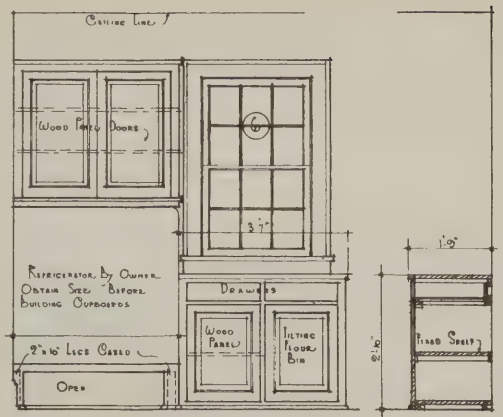
6	1	Hinged Sash	3	8"x 10"	2'-4" x 1'-8"	1¾"	See Detail
1	2	Dbl. Hung	4	10"x 16"	2'-1" x 3'-2"	1⅜"	" "
2	3	" "	16	10"x 12"	3'-8¾" x 4'-6"	"	" "
4	4	" "	12	10"x 12"	2'-11½" x 4'-6"	"	" "
2	5	" "	8	8"x 10"	1'-9" x 3'-10"	"	" "
3	6	" "	12	8"x 10"	2'-4½" x 3'-10"	"	" "
1	7	Casement	3	8"x 10"	2'-10" x 3'-0"	1¾"	" "
2	8	"	6	8"x 10"	1'-9" x 3'-0"	"	" "
6	9	Dbl. Hung	8	10"x 12"	2'-1"x 4'-6"	1⅜"	" "
1	10	" "	12	10"x 12"	2'-10½" x 4'-6"	1⅜"	" "
1	11	Transom	3	10"x 12"	2-10½" x 1'-5"	1⅜"	" "



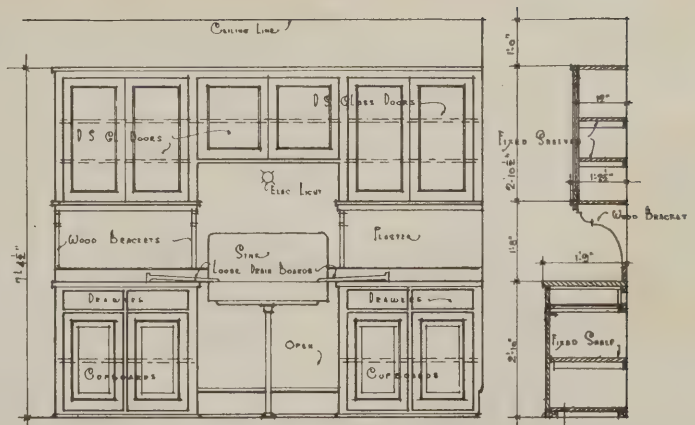
Side elevations of House No. 6A49 designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc. Copyrighted by National Builder and The Architects' Small House Service Bureau



·Section·

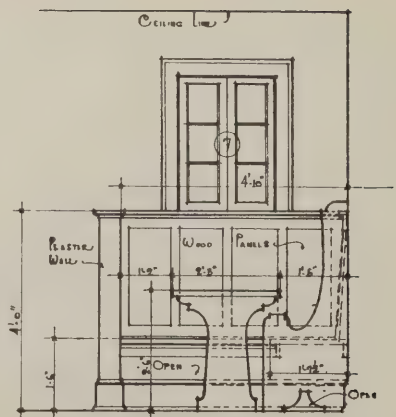


·Elev Of Kitchen Toward Ice box·
Scale ½"=1'-0"

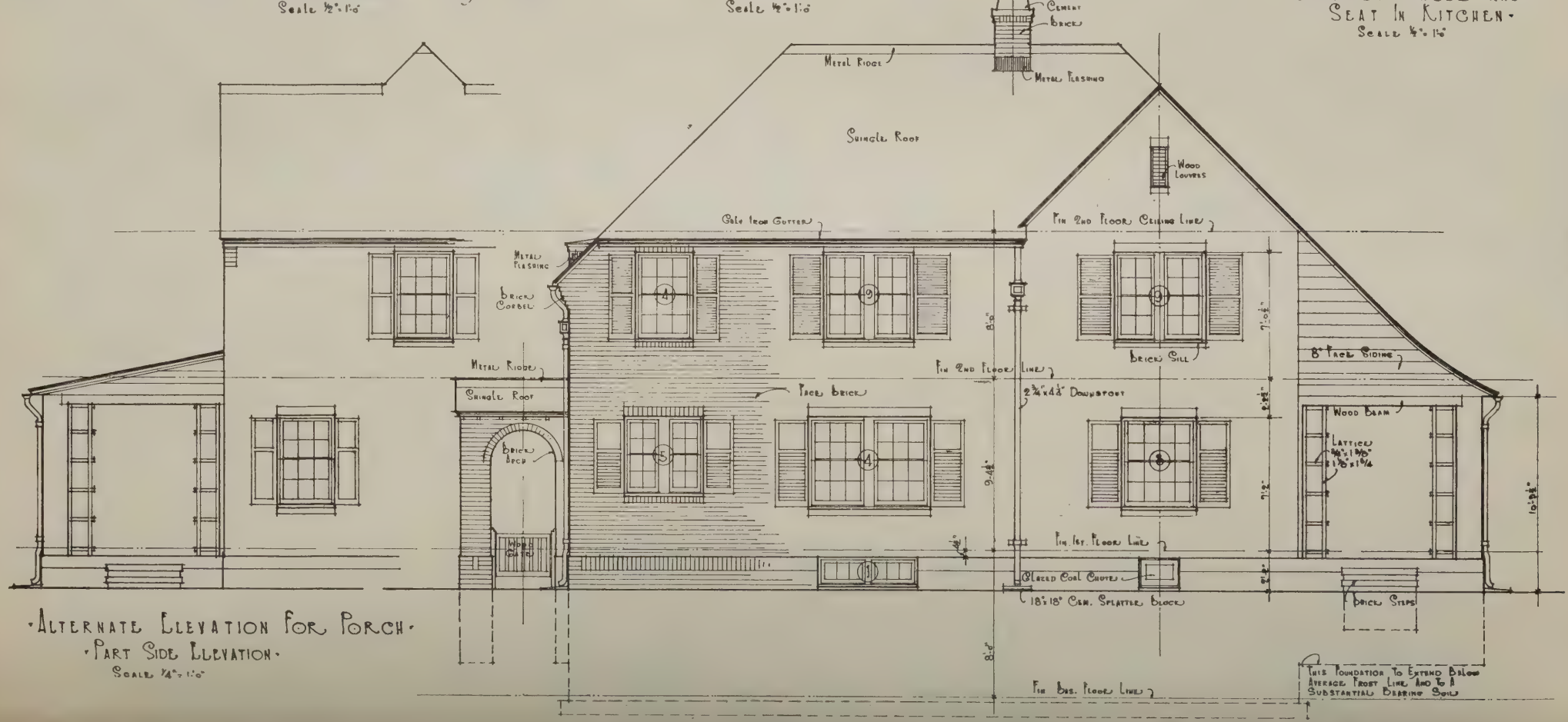


·Elev Of Kitchen Toward Sink·
Scale ½"=1'-0"

·Section·

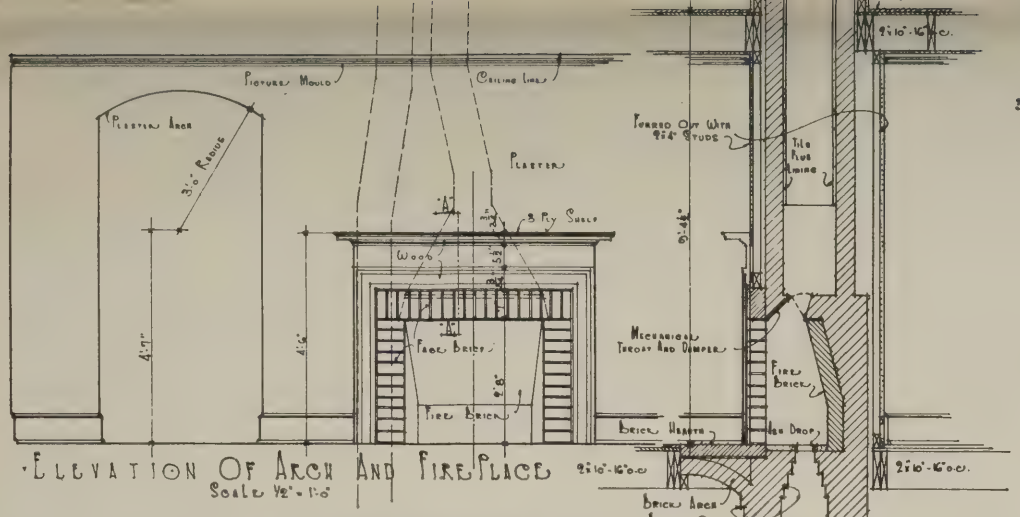


·Elev Of Table And Seat In Kitchen·
Scale ½"=1'-0"

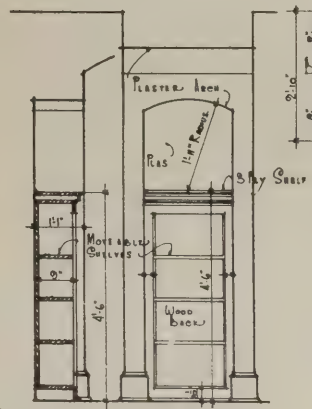


·Alternate Elevation For Porch·
·Part Side Elevation·
Scale ¼"=1'-0"

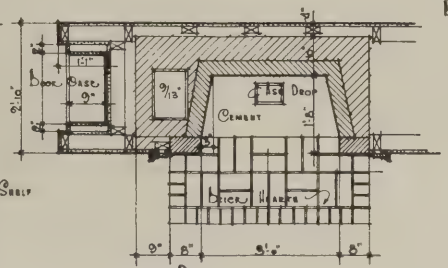
·Rear Elevation·



ELEVATION OF ARCH AND FIRE PLACE
Scale ½"=1'-0"

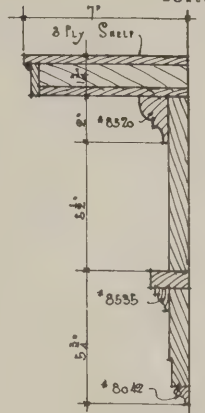


SECTION · ELEVATION ·
DETAIL OF BOOK CASES IN ARCH BETWEEN LIVING AND DINING ROOMS
Scale ½"=1'-0"

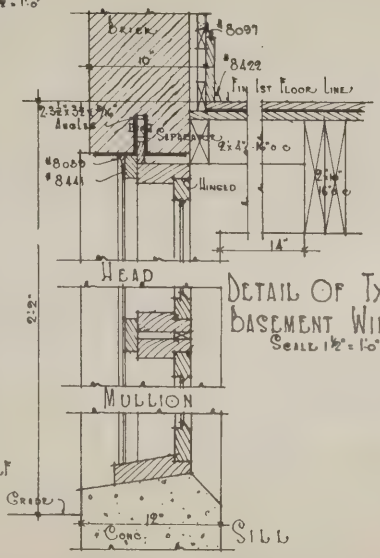


PLAN OF FIRE PLACE
Scale ½"=1'-0"

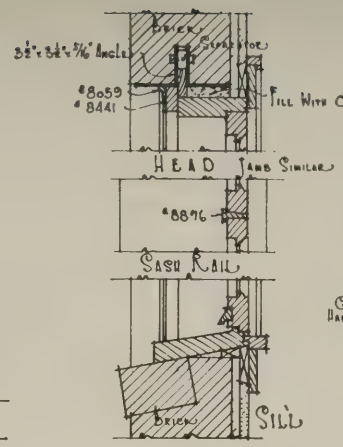
SECTION THRU FIRE PLACE
Scale ½"=1'-0"



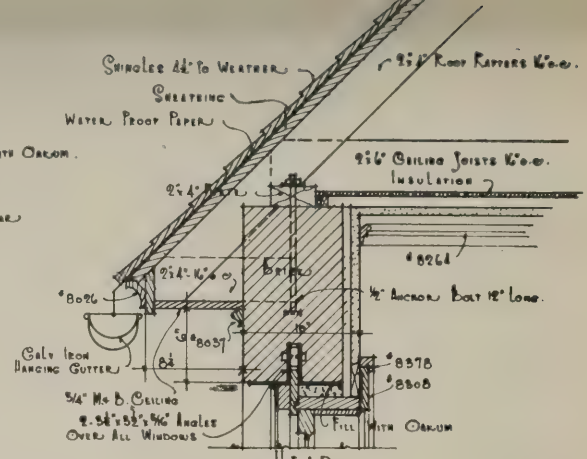
SECT "A-A" THRU MANTLE SHELF
Scale 3"=1'-0"

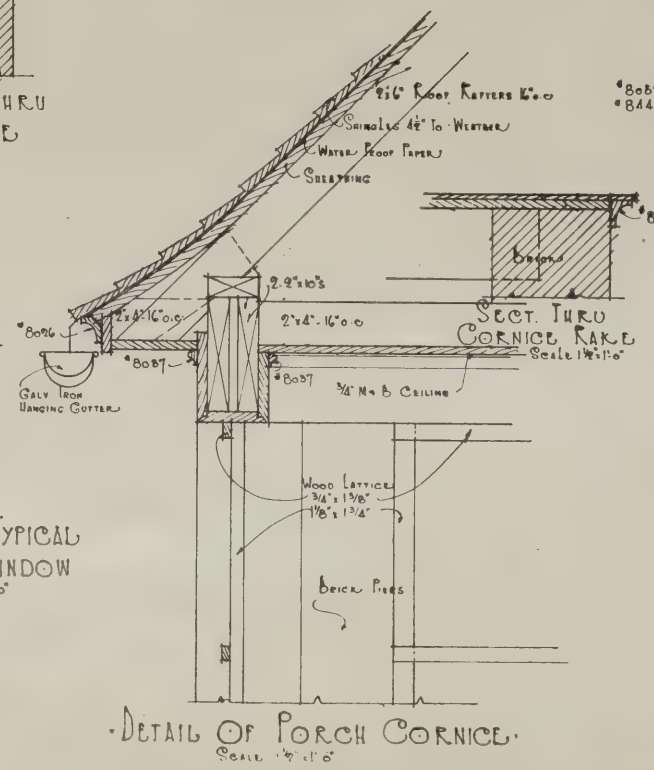


DETAIL OF TYPICAL BASEMENT WINDOW
Scale 1½"=1'-0"



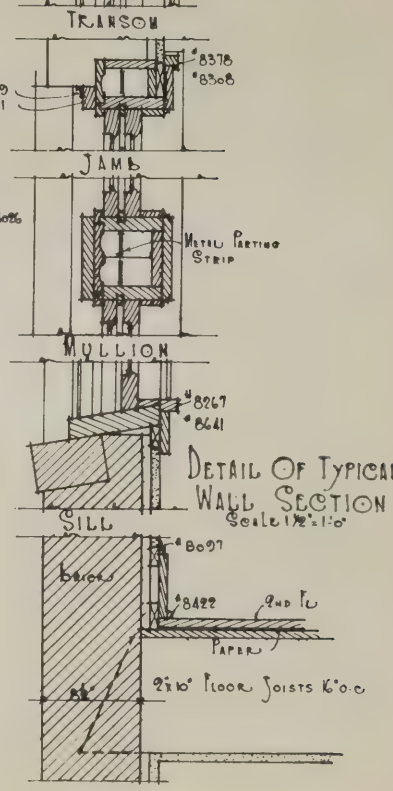
DETAIL OF CASEMENT WINDOW
Scale 1½"=1'-0"





SECT. THRU CORNICE RAKE
Scale 1½"=1'-0"

DETAIL OF PORCH CORNICE
Scale 1½"=1'-0"



DETAIL OF TYPICAL WALL SECTION
Scale 1½"=1'-0"

Structural details of House No. 6A49 designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc. Copyrighted by National Builder and The Architects' Small House Service Bureau

Questions, Answers, Kinks and Discussions

Edited by V. L. Sherman

Herein is a Department of Mutual Help for the Exchange of Experiences and Ideas. It is Not Only Well Worth Your While to Give Your Experiences for What You Get Back from Others, but National Builder Pays You $5 Each for Every Good Kink

Plaster Board

THE following letter comes from F. B., Norristown, Pa.:

"The plasterers in the East have created a situation that compels a great many builders to use plaster substitutes in the way of wall board or plaster board. This is being done very successfully when the work is handled by competent carpenters.

"To date, I have not seen in practice or in any magazine any suggestion for protecting sharp corners. At present we are beating the weather by doing a very good job in plaster board. As we promised a satisfactory job, it is up to us to make a good solid corner. What we intend to do is to take a strip about 1 in. wide and the thickness of the plaster board and nail it to the studding to form the corner, as shown in the cross section, Fig. 1. What we want is a wall as smooth when papered or painted as a plaster wall.

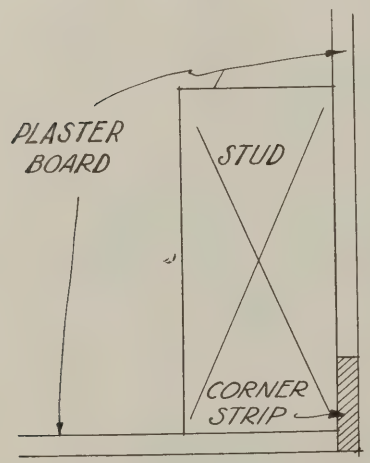


Fig. 1—Corner strip for plaster board

"We hope someone will invent a satisfactory corner strip Any suggestion of a better method than ours would be appreciated."

The editor believes that with the tremendous growth in building specialties many of the manufacturers have come to overlook the fact that their product is more or less of a substitution, all be it, superior to the original, and that, as their product is novel when combined with general building, as much care should be used in showing its adaptability as in showing its superiority. This looks like a good year for kinks in the use of wall board.

An English Field Gate

THE sketch shown, Fig. 2, is that of an English field gate. It will be of interest to those who are on the lookout for such deliberate construction combined in practical construction and mellowness. The writer confesses that the leisurely touches he finds in out-of-the-way places attract him more strongly than the carefully worked out artistry in town building. The more natural progress of the older places carried on by generations, provides a distraction from the common run of distraction provided by the square-cornered, straight-lined houses that some of us build for homes. If there is any doubt in mind about building this gate, and no Englishman is near, ask a Scandinavian. He can tell you all about it.

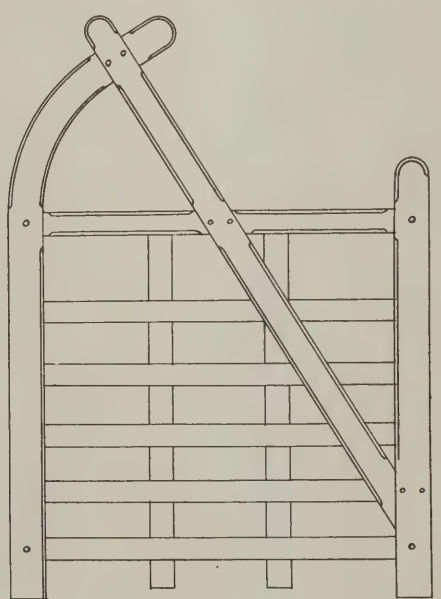


Fig. 2—Design for an English field gate

Building Stone Chimneys

THE letter which follows, from A. G. H., of Lake Nebagamon, Wis., may serve two classes of builders, and it may come in handy particularly at this time of the year.

"Some of the farmers around Lake Nebagamon have recently hit upon the idea of building stone chimneys. These are found to be equal to any built out of brick in strength and durability No brick are required in building these chimneys as they are made entirely from stones and mortar. See Fig. 3. Farmers generally have an excess of stones on their land, and by saving these they can be converted into chimneys and save the cost of brick.

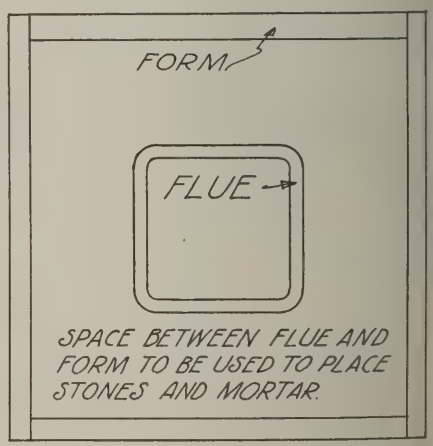


Fig. 3—Cross-section of a stone chimney

"In order to build a stone chimney the first necessary thing to have is forms, which are made out of lumber. The forms are made according to the size wanted and must

ncircle the flue or lining, leaving a space arge enough to place the stones and mortar n. From 6 in. to 8 in. will be found suffi- ient in most instances. The mortar should onsist of about one-half cement and the bal- nce of lime and sand. Stones should not e too large, although to use small ones xclusively is not practical in time and labor.

"The bottom form can be made from 7 ft. o 8 ft. in length, but as the chimney ad- ances, additional forms will be needed. hese should not be more than 4 ft. In order o fill all spaces between the stones with ortar a stake of wood may be used. The orms should not be removed until the mor- ar has settled and dried. It is well to bear

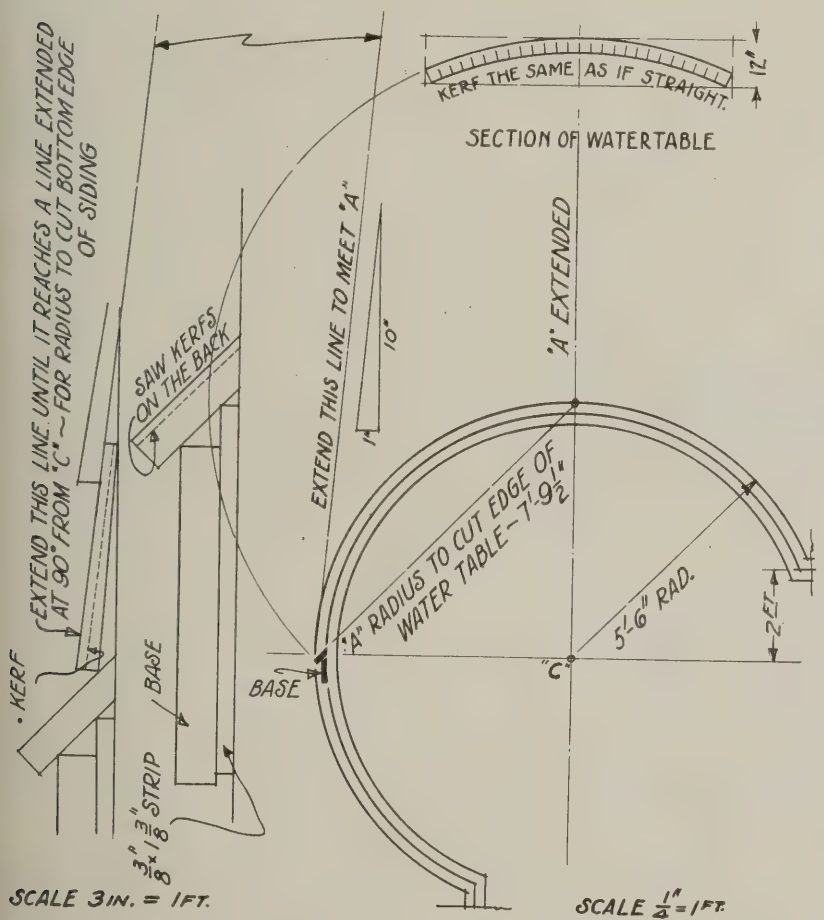

EXTEND THIS LINE UNTIL IT REACHES A LINE EXTENDED AT 90° FROM "C" — FOR RADIUS TO CUT BOTTOM EDGE OF SIDING
KERF THE SAME AS IF STRAIGHT.
12"
SECTION OF WATERTABLE
"A" EXTENDED
EXTEND THIS LINE TO MEET "A"
10"
14"
SAW KERFS ON THE BACK
"A" RADIUS TO CUT EDGE OF WATER TABLE — 7'-9½"
5'-6" RAD.
2 FT.
"C"
KERF
BASE
BASE
STRIP
3" x 1⅜" 3"
SCALE 3 IN. = 1 FT.
SCALE ½" = 1 FT.

Fig. 4—Watertable on the arc of a circle

mind that these chimneys cannot be built ithout using flue and forms."

Kerfing a Watertable

E wish to add one more kink on kerf- ing which is submitted by B. R. M., Charleston, Ill., and has to do with ending a plain watertable on a circle or und corner." See Fig. 4.

"First the circle is struck the size re- ired. Then draw a line supposedly hori- ntal, and from this in the center draw a rpendicular line. From these lines where ey intersect the circle, draw a line which ould be extended the width of the water table. This gives the radius to cut the outer edge of the water table. Then it should be cut out the width required by gaging from the edge that is sawed on the circle. Then it can be beveled and kerfed and put in place. The face will stand on an angle of 45 deg., but if it is desired to have it flatter, let the radius line intersect the perpendicular line lower down. If you want it steeper, raise the line to the desired pitch.

"This line continued on the pitch you want always, gives the radius to cut the outer edge of the piece to be sprung, no matter how wide or how narrow it may be. If the round corner is to be weather-boarded, the line must be extended on the face of the siding until it meets the perpendicular line to give the radius to cut the lower edge of the weather boarding. Of course, this will reduce the widths of the boards at the ends. They should also be kerfed on the back so the strength of the wood is no greater at the bottom than the top. It appears according to my drawing the face of the siding falls toward the center line about 1 ft. in 10 ft., which would make the radius to cut the boards 55 ft. However, in this drawing I do not presume to give dimensions. The only idea is to get the principle of laying out the work."

Framing Critique

THE writer of the foregoing also writes: "In the February number of the National Builder I see some sketches for corners which do not appear to my liking. Fig. 2 shows two pieces of 2x4 nailed flat together and as each is only 1⅝ in. thick. The total is 3¼ in. The other 2x4 pieces are 3⅝ in. wide. Then we will have to bend the lath back ⅜ in. to fill the corner studding out. Fig. 4 leaves the 2x4 that makes the angle corner with no support behind it, and a little carelessness in nailing will leave

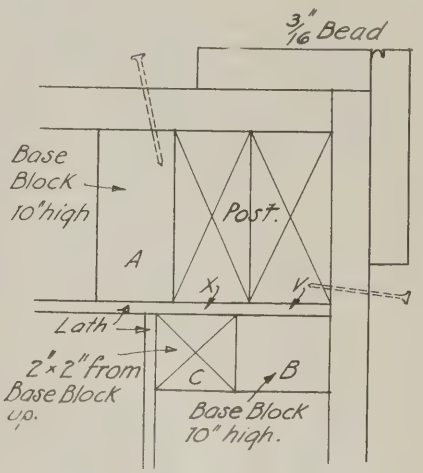


Fig. 5—Corner post framing detail

it in a shape to get knocked loose and make a bad corner."

Figure 5 shows a version sent in by S. F. B., of New London, Ohio. "I put the base blocks in to give solid backing for the base. Block *A* goes in ahead of the lather. Lath can be cut any length between *X* and *V*. Block *B* is put in by the lather. I start the nails in the 2x2 and tack it up in the corner ready to use. *C* goes from the base block up. Why use a 2x4 when the smaller piece does the work?

"The bead is used to hide the joint in the corner in case of a little shrink or swell. Now for criticism and arguments, I do not claim I am right, but I do claim I have a good corner. Fig. 2 in the February number of the National Builder has no solid backing. The narrow corner board and siding has only the sheathing to which to nail. Fig. 3 is better and has good solid nailing for both siding and corner boards, but the third stud could be a 2x2 and save half. Fig. 4 I do not like as there is no solid backing for one corner board or siding. Fig. 5 is good."

Using a Router

A. R., of Sheboygan, Wis., writes that he finds a router "a handy tool for routing stairways, jambs, etc. I also experimented and found the tool handy for fitting door butts. After the door is fitted as usual I mark the butts for the door, chisel in for the depth, then with the router set correctly, rout out the wood. This gives an accurate and even job."

A Curved Roof

W. W. M., of Barnum, Minn., writes: "Whenever I wanted to figure the gradual bend in a roof, as shown in Fig. 6, I had trouble until I hit upon this plan. Locate point *D* just where you want it on the elevation. Then locate *C* where you want the curve to start Draw the line *C D* and locate the point *B* half-way between. Draw *B E* perpendicular to the chord *C D*, and draw *C F* perpendicular to the roof line *G C*. Where the two lines cross is the center

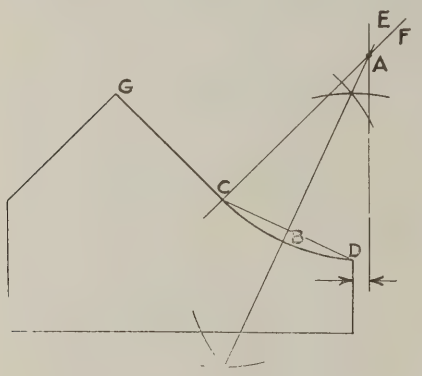


Fig. 6—Figuring a curved roof

of the radius for drawing the curve.

"One thing to have in mind is to keep the point *A* to the right of the point *D*, or you will not have a water-shed. If the point *A* comes to the left of *D*, and you cannot lower the point *D*, place point *C* farther up on the roof and then locate point *A*. By drawing it to scale you can easily cut the curve in your timbers without any trouble. This will work on any pitch of roof.

Humidity Tests in Dwellings

THIS department wishes to elaborate a bit on the letter published in the National Builder for March concerning moisture content in the warm-air supply. The matter of humidity has been of interest to engineers and physicians for many years, and many texts and reports have been published. Tangible results have brought increased interest in air-conditioning as affecting the efficiency of workers in given lines School children are affected easily by changes in the humidity of the air in a classroom. The general health of a family may be affected by the changes in the humidity in a home. It impinges on our bodily comfort and the coal pile. But I find most of the reports pertain to such things as passenger coaches, public halls, and moving-picture theatres, which are rather humid, anyway.

Two charts are shown. Fig. 7 is a partial copy of the humidity chart devised by Dr. Carrier to determine the percentage of humidity through the use of the wet and dry-bulb thermometers. Fig. 8 is a set of curves ranging from uncomfortably warm to uncomfortably cool, graded by humidity percentage and room temperature A too dry atmosphere affects the mucous membrane, and allows such rapid evaporation from our epidermis that bodily warmth is dissipated. A too damp atmosphere, contrariwise, hinders evaporation and confines the body heat that naturally would escape. As you will note by the curves, the comfort and percentage depend on the temperature, but the

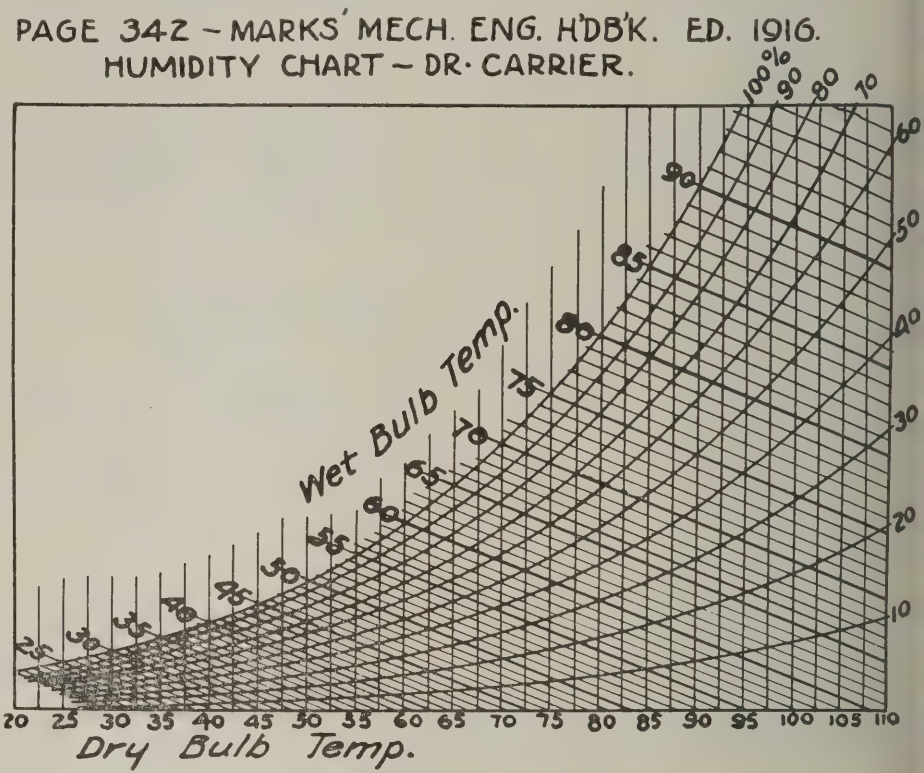


Fig. 7—Chart for determining percentage of humidity

writer believes that there is another factor still. That is age.

If two thermometers are fastened to a

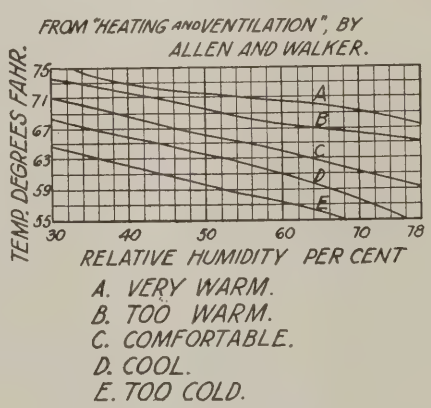


Fig. 8—Relation of humidity percentage to room temperatures

board which may be swung to cause circulation of air around the bulbs, and one of the bulbs is snugly wrapped in a saturated cloth, two readings may be taken that will give the difference in temperature. This difference, say 68 deg. for the dry, and 54 deg. for the wet bulb, will show on the chart, Fig. 7, a percentage of about 36, and a tendency to chill on the chart, Fig. 8. Then suppose you produced a higher percentage of humidity by artificial means. The room would gradually become more comfortable as the increased moisture would hinder evaporation from the skin and the body would hold more of its heat.

A bright, hot, dry day in summer is very comfortable as compared to a muggy one at a lower temperature.

Why Not?

IT is so easy to "pass the buck" to the plumber, or the tinner, or somebody else that a builder is quite likely to find himself in a very embarrassing position unless he keeps abreast of the times. A really competent builder is his own plumbing inspector. All builders should be. Notice the following letter.

"I am employing a feature which I would like some advice on. A 4-in soil pipe is carried down to the laundry wall (8 in.), first floor, and adjoining it is a 4-in. galvanized pipe for connection from the gas range. It is my purpose to carry the galvanized pipe vertically alongside the soil pipe and connect it with the soil pipe by an elbow above the top fixtures in the bathroom above. I have never heard or read of such a construction feature, and, as it will save me a chimney, I am anxious to employ the above method."

To any one who can spare the time, the editor would say that no history is quite so illuminating as the history of plumbing. The present codes have been fought for, and any infraction is likely to prove embarrassing. The author of the letter is not trying to violate the code and has a possible solution at first glance. What is the matter with it?

Paint as an Aid to Renting and Selling

2. Drying and Causes of Paint Decay—Paints for Special Purposes — Shingle Stains and Fire-Retardant Paints

By Albert Brace

The Question of Drying

However rushed the work may be it is nfair to the paint used not to allow suffi-ient time for drying between coats. Paint oats exposed to the sun and weather on ll sides will dry out somewhat quicker han those in a confined space and heavily haded. Humidity in the atmosphere will lso effect drying and under conditions of xcessive humidity it is allowable to add roportions of artificial dryer. Only the xperienced should attempt this however.

In general terms, and subject always to pecial conditions, it may be said that at east from four to six days should be al-owed for the priming coat to dry all the ay through, and from one to two weeks or the middle coat. Too long an interval etween coats may often be as bad in re-ults as too short a time. All paint contains n itself some artificial dryer as linseed oil oes not dry fast; raw linseed oil tends to ake paint dry from the bottom out, where-s, the boiled oil does the reverse, spreading film over the top of a drying paint that nderneath is still wet. Turpentine pro-notes drying, being volatile, but its principal unction is to bring about penetration. In-identally, as a thinner, it helps a paint to rush out more smoothly, thus rendering possible to cover more surface than would e possible with linseed oil alone. But its ervices are immediate only, that is, confined o the actual time of application, leaving nseed oil to bear the real burden of hold-ng the pigments to the surface.

Causes of Paint Decay

We have previously pointed out that all aint must at some time or other succumb nd cease to give protection and have noted ne length of time a good paint properly pplied may be expected to last. Whenever fails to give maximum service, the cause traceable, in the great majority of cases, o factors which are known; by familiariz-ng himself with them, the builder places imself in a position to guard against them, or in every case we will give the cause as ell as the results.

The reader who has been patient thus far ill have been able to conclude that for a aint to yield the protection we reasonably xpect, it must first be good paint, second, e applied according to sound working ethods, and thirdly, under uniformly fav-rable conditions of weather and surface. Vith all circumstances of the best, such paint will gradually wear away, main-ining always a preservative film and offer-ing at the last an ideally favorable surface for repainting. Where any of the factors outlined are not up to scratch, any one of the following forms of disintegration may occur within a longer or shorter time, usually the latter.

Cracking, one of the inevitable causes of using cheap materials, is caused by the paint not having the proper combination of ingredients and therefore not drying uniformly. Cracking leads to scaling and is the result of an inelastic film that cannot expand and contract with the wood beneath. Rain and weather are quickly let in and rotting of the lumber commences if the condition is allowed to persist. The remedy is to scrape off all loose scales with a coarse, stiff wire brush, using a scraper in stubborn spots and when the surface has been rendered as smooth as possible, repaint.

Alligatoring means the formation of a network of fine hairline cracks forming blocks and triangles of every conceivable geometrical design. It is also called "checking" and differs from the preceding in that the cracks do not go all the way through to the wood. The cause usually lies in too great haste, whereby a second or third coat was applied over one underneath not thoroughly dried. The same trouble will occur when a cheap priming coat has been used and reduced with some non-drying substitute thinner. The chemical effect is the result of adhesion between two coats which contract and expand at different rates, the less elastic top coat, being unable to act as rapidly as the more elastic undercoat, is broken apart. The prevention is to give plenty of drying time and use only proper priming materials. While the protection may last some time in spite of this, continued wear will eventually bring on peeling and the wire brush will have to be brought into play again.

Peeling can usually be traced to the improper application of paint, that is, over dampness caused by dews or frost, or to the paint becoming chilled while drying, thus giving it no opportunity to penetrate. Lack of sufficient turpentine in the priming coat may also be the cause, especially on resinous woods like cypress and yellow pine, or the use of boiled oil instead of raw oil in the same coat. Generally speaking, peeling is the result of either water or resin forcing itself out through the paint, of improper thinners which did not give adequate penetration to the priming coat or of the use of yellow ochre for this first coat. The methods of prevention are obvious, the only remedy is to burn or scrape off all old paint and start over.

Blistering is usually attributed to the presence of moisture or sap in new lumber which is brought to the surface by the heat of the sun. The paint, if it is of good grade, simply bulges—if of poor quality, it scales. If these blisters are tapped with the finger, they crack, and often the guilty drop of water trickles out; eventually wind and weather break these blisters and peeling sets it. The prevention is to give the lumber plenty of time to dry out, to use only lumber that is properly seasoned, permit no leaky plumbing and to start no paint when plastering is fresh.

Spotting grows out of uneven mixture in the wood itself, causing it to absorb unduly at one point and hold out the paint at another. In the former case, the paint will fade and in the latter, maintain its gloss, the manifestations taking place in widely scattered areas, in small groups or on certain boards. The flat spots indicate a lack of sufficient oil in the priming coat at these points and represents a condition peculiar to hard and yellow pine that is very difficult to guard against. The remedy is another coat of paint, not merely linseed oil.

Conclusions

It will be seen from the foregoing that the purchase of a good mixed paint of any brand or the use exclusively of hand-mixed lead and oil is in no sense a full guarantee of a successful painting job. Long life, good appearance, freedom from the necessity and expense of frequent, annoying repairs can only be assured by a combination of conditions and precautions which we have been at pains to point out. If anything has been omitted it has been for the sake of brevity or for the purpose of avoiding technicalities.

Porch Floors and Steps

In addition to color harmony with the rest of building scheme as well as normal weather wear, porch floors and steps have to meet an extra strain of their own arising from scuffing feet, scraping snow shovels and frequent hot and cold water scourings. As ordinary house paint would not stand up under such treatment it becomes necessary to add to the regular lead and oil content a suitable proportion of tough floor varnish. By applying not less than three coats a good sound protection will be afforded, and splendid ready to use products for this special purpose are put up by almost all manufacturers. Once a painted porch gets in bad condition, it is a particularly hard job to get it back into sightly as well as protective shape—expensive repairs almost always follow continued neglect or the use of unsuitable products at the start.

Cement, Brick and Stucco

For many years it was thought that concrete and cement required no paint protection, but how incorrect this belief was may be gathered from a comparison of their relative porosity with wood. Water penetrates concrete at the rate of about a half inch in 24 hours and once

this freezes, the expansion causes cracks which hold more water and a disfigured, eroded surface soon follows. Concrete and cement not only absorb moisture readily, but retain it for a long time, so that unless aged at least through a winter, spring and summer before being painted, peeling will surely result. The same is true of the free lime content in each, which acts destructively on the oil in the paint, manifesting itself in the form of a whitish, salty deposit on the surface. This is customarily neutralized by an all-over wash with a solution of zinc sulphate and water—about 6 to 8 oz. of the former to a gallon of the latter.

Much of this applies to brick, stucco and artificial stone as well and in addition to the necessity for a dry, neutralized surface all of them should be scrubbed with a stiff fibre brush to remove all loose particles which would give an imperfect bond to succeeding paint coats. Brick may be painted glossy or "stained" dull with so-called flat brick colors put up in paste form. House paint gives better protection, of course, and the first coat should be thinned with plenty of dryer, followed by at least three regular coats with plenty of drying time between. There are special paints for cement, stucco and concrete, some of which are designed to be applied over slightly moist surfaces without danger of peeling; their use is recommended over ordinary house paint for this class of work.

Special Paints for Concrete

These special cement paints are also very useful in cellars. The writer knows a case where a man desired to fit up a billiard room in his basement and did so only to find the atmosphere rendered dank and chilly from the moisture laden walls. A treatment with ordinary house paint quickly resulted in peeling and he was about to give up in despair when a friend recommended a certain brand of concrete coating which efficiently sealed up the walls and made the room warm and cosy, as well as pleasantly decorative.

Steel, Iron, Tin and Copper

All of these require special treatment and the first three all have special paints manufactured for them on a metallic base. Steel is not very frequently met with in residential construction so far as exteriors are concerned, but roofs of tin are fairly common. It most often comes ready for laying with the under side coated with an iron oxide paint, since tin will rust with equal facility from either side. The glossy top side will usually be found to print under the thumb, a consequence of having been dipped in palm oil at the time of manufacture. This oil will either disappear from exposure to weather for a few months, or if prompt painting is desired it can be washed off with benzine. Tin should be painted in warm weather at the time of its greatest expansion; if coated on a cold day the later effect from heat will tend to stretch the paint film unduly and cause it to crack.

Galvanized iron also possesses a lustrous greasy surface, and like concrete may be permitted to weather for an extended period or given a preliminary chemical treatment and painted at once on a warm dry day. The treatment may consist of brushing on a coat of strong hot vinegar or a solution of 6 oz. of acetate of copper to the gallon of water. Following this two coats of paint may be applied. The first coat, red lead thinned to priming consistency and the second, either a special brand according to directions or an ordinary house paint. A third coat may be necessary if the color doesn't hide the red lead fully. There are various special "rougheners" for galvanized iron, all of which serve to kill the grease and give a "tooth" to the paint work.

Copper gutters, downspouts, cornices and flashings are being strongly pushed to the trade by national and other publicity, but painting is not customarily advocated owing to the natural coloring effect of the elements on the base metal which produces the dark olive color known as "verde." Where it is desired to paint new copper, it should first be washed with benzine; ordinary house paint, to which a small quantity of spar varnish is added, may then be used, the first coat thinned with a quart of turpentine to the gallon, the second coat straight.

Shingles

Shingles may be either stained or painted; in either case the process preferred is dipping, though in some cases they are both dipped, then laid and stained or painted again by brushing. In order to save time, many builders order their shingles ready stained, using either one color on a roof or a combination of different shades to produce a harmonious motley or "autumn" effect. Where the shingles are stained on the job the custom is to have a handy barrel or keg containing the stain, the shingles being immersed two-thirds butt end down and held at the thin end with pliers, which also serve to stack them in a drain trough. The creosote shingle stains are best, as their colors hold well and the preservative anti-insect qualities are of the best. Nevertheless, stained shingles are primarily decorative and do not possess the durability of the carefully painted ones.

Fire-Retardant Paint

There is a special product for this latter class of work known as fire retardant shingle paint put up by all leading manufacturers and owes its popularity to the well known inflammable properties of curled, fuzzy shingles. A hot cinder from a passing locomotive lodged in such a shingle when simply stained has the best chance in the world of igniting, and insurance agents have taken due note of it. The special shingle paints usually contain a large proportion of metallic pigment which tends to offer a spark much the same sort of resistance as a tin roof.

Shingles when painted should be dipped, laid dry and then given a second coat, brushing well into under seams and cracks. Some painters even go so far as to paint the underlap as well just prior to laying, thus forming a cement between the two surfaces. A roof so laid will last a long time, resist the curling effect of the sun and be reasonably immune to sparks and cinders. Both shingle stains and paints of all types come ready made in a variety of tasteful shades and careful selection will give a harmonious blend with the rest of the building's decorative scheme. Cypress and yellow pine shingles require paint treatment of a special nature, as indicated under those headings in the March installment of this article.

Exterior Varnish and Enamel

All varnish manufacturers put up a special product for outside varnish work and in most residential construction the necessity for its use is confined to porch ceilings where made of beaded lumber and to front doors. No floor or interior varnish should be used, nor an article which has not a reputation for this class of work—hodge podge mixtures, leavings and bargains will quickly turn white, streak, crack and eventually disappear into thin air, leaving expensive wood and carpentry at the mercy of heat and rain. Another reason for care in selecting a varnish that is really a "spar" is the rapid expansion and contraction it will have to endure as a result of exposure to constantly varying temperatures.

A short oil varnish would quickly give way under such a strain and the work would have to be done over promptly to prevent the wood from warping or splitting. A flat varnish should never be used; if a dull lustre is desired, rub down the spar varnish with pumice stone and water. Unless a natural finish is desired, the wood must, of course, first be stained, and if open grained, such as oak, be filled with an appropriate shade of good paste filler as well.

Very much the same applies to exterior enamelling. The enamel must be long in oil, given plenty of time between coats for drying and be a job of at least four coats, including priming coats. No special enamels are made for exterior residential work, but it is more than dangerous to experiment with any which the manufacturer will not whole-heartedly recommend for the purpose and back up with a guarantee if properly applied.

The Situation—How Long the Boom?

THE building boom is here. Sober men are asking themselves how long it will last—and what then?

Those who are in the best position to foresee some of the present tendencies and their results are counseling caution. Secretary Hoover, of the Department of Commerce, has officially advised the President to prevent the United States government from competing with private interests for building materials and labor—to hold off government building for a few months at least. Secretary Hoover's conclusions are:

Secretary Hoover's Analysis of Present Building Situation

1. The year 1922 was a year of very large employment and activity in the construction trades and at the end of the year stocks of construction materials were very much reduced. Since the beginning of the present year there has been even more activity than in the same period last year and the contracts let in the past few months are of larger volume than any hitherto entered into in a similar period. Advance orders for construction materials are upon a very large scale.

2. Labor in the construction trades and in the manufacture of materials is not only at full employment but there is actually a shortage in many directions.

3. Transportation facilities available for the building materials are fully loaded and almost constant car shortages are complained of with consequent interruption in production.

My conclusion from all this is that, at least for the next several months, the trades will be fully occupied in private construction, all of which is generally needed by the country.

For the government to enter into competition at the present moment will give no additional employment to labor and no additional production of materials but must in the broad sense in the end displace that much private construction. The governments, nationally and locally, are in a much better position to hold construction work in abeyance than are private concerns, and are in better position to speed up in times of less demand as we did in the last depression as the result of the unemployment conference. We can by this means contribute something to a more even flow of employment not only directly in construction work but in the material trades.

I would recommend, therefore that you direct the different divisions of the government to initiate no new work that is not eminently necessary to carry on the immediate functions of the government and that there should be a slowing down of work in progress so much as comports with real economy in construction until after there is a relaxation in private demands.

Based on Nation-Wide Survey

As a result of a systematic nation-wide survey of the building situation on March 16, Mr. Hoover finds that the cost of a frame house had advanced 17 per cent from February, 1922, to February, 1923. The cost of a brick house had advanced 16 per cent in the same period and wholesale prices 23 per cent. Among other things this shows that building material costs are actually behind the advance of commodity prices as a whole. Mr. Hoover says further:

The limiting physical factors in the amount of construction to be undertaken in the future are labor, materials, and transportation.

It may be said generally that labor is in full employment at the present time, and the increase in construction demand during the spring months on the basis of contracts already let indicates even increased shortages over those now existing. Considerable numbers of material manufacturers are running at full capacity, and where production capacity is under-employed at the present time it is largely due to shortage of labor.

Advance orders are greatly in excess of those a year ago. Combined figures of seven large lumber associations show an increase of 49 per cent in orders received during the first nine weeks in the year, over the same period in 1922. Unfilled steel orders of the largest company were 71 per cent greater at the end of February than a year before. Sales of fabricated steel for the first two months of 1923 were 85 per cent above the same period in 1922. January orders for sanitary pottery made a new high record for all time. Trade reports for other commodities not covered by adequate statistics indicate similar tendencies.

From the above it would appear that the building and construction necessities of the country are being taken care of so far as labor, material manufacturing, and transportation facilities permit, and that the addition of governmental projects at the present time will not add to the production of materials or to the amount of employment in the country, but would in fact mean simply displacement of construction that could be undertaken at private hands.

Mr. Hoover's Statement Being Misinterpreted

What Mr. Hoover has said is of the utmost importance to the construction industry not only because he is a high government official and known to be a most exceptional student of business economics; but because his remarks are receiving and will continue to receive tremendously wide publicity. Newspapers everywhere are picking them up and giving these remarks their own interpretations. For example, a Columbus, Ohio, newspaper comments as follows:

If the government knows that building costs are way out of proportion to what they should be, and the government has the facts obtained in a comprehensive investigation, that same government should have devised some means of puncturing the outrageous inflation.

Perhaps the government's "building strike" will have a healthful effect on the industry. The government is not alone in hoping that it will.

If such an interpretation is accepted broadly it will do an immense amount of harm. In fact, there is abundant evidence of the jumpy character of the present boom. Already big projects are being postponed. On March 19 it was announced that the Federal Reserve Banks would call a halt to any further building "until the present congestion in the building activities of the country is materially relieved and the costs of building lowered."

Too much of this year's prosperity boom is founded on the well-known psychology of "keeping up with the Jones'." Mr. Jones has a fine new car, why don't we? Mr. Jones is building a new home, why don't we? Obviously that is a shaky foundation; and the well informed builder, contractor and architect will be inclined to become a little conservative.

It was predicted in 1920 that we would go through rapid periods of booms and depressions. Just now we are reaching the peak of a full-fledged boom. All agree it will last for the first half of the year; contracts let assure that. What then? It rests largely with the building industry. Don't overwork a good thing.

Manufacturers and Dealers Generally Fighting Price Increases

A review of present conditions by one of the largest building material dealers in the Middle Atlantic States (Tomkins Brothers, New York, Newark and Philadelphia), under date of March 20 states:

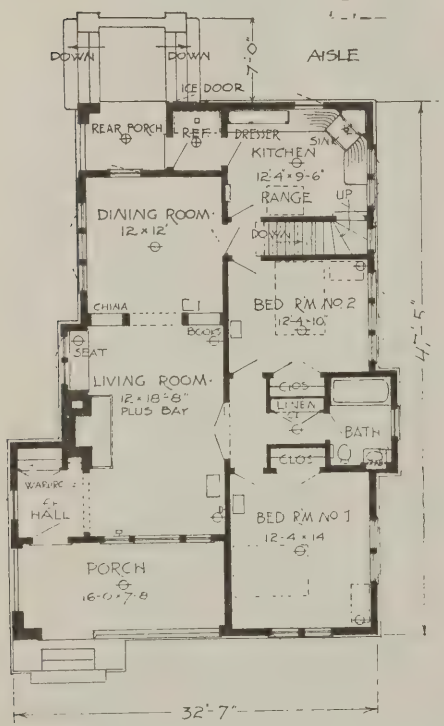
This Trade Review has the benefit of information supplied by the general sales manager of one of the largest building material manufacturers in the country. He has just completed a trip covering the entire country and reports that in all sections construction work is going ahead at a rapid pace, and the indications are that the demands for materials will be more than the manufacturing plants can meet, particularly in view of their curtailed shipping facilities due to the inability of the railroads to keep pace with production. In all parts of the country practically every man who wants to work and who can work is employed. In nearly all industrial centers an increasing shortage of labor is reported, and the obtaining of labor is so exigent that Congress has been besieged by requests for a modification of the immigration laws.

Manufacturers of building material have, almost as a whole, adopted the wise policy of trying to hold their prices down as much as possible. At the same time most of them are faced with increasing wages and underproduction due to the inability of the railroads to take away their finished goods. Both of these factors are conducive to higher prices. Yet the lesson learned in 1920 shows the great importance of keeping prices at as stable a level as possible. Heavy increases, particularly unwarranted ones, either wholesale or retail, are sure to "kill the goose that laid the golden egg." There are, even now, signs of inflation in some quarters, and if this should develop to unhealthy proportions it will most surely be followed by a corresponding deflation, with a demoralization of trade conditions such as were experienced in the fall of 1920.

Builders' Shows Now Under Way

Minneapolis, Chicago, Cleveland, New York, Detroit, Newark and Other Cities Are Centers of Expositions to Educate Building Public and to Encourage Better Building

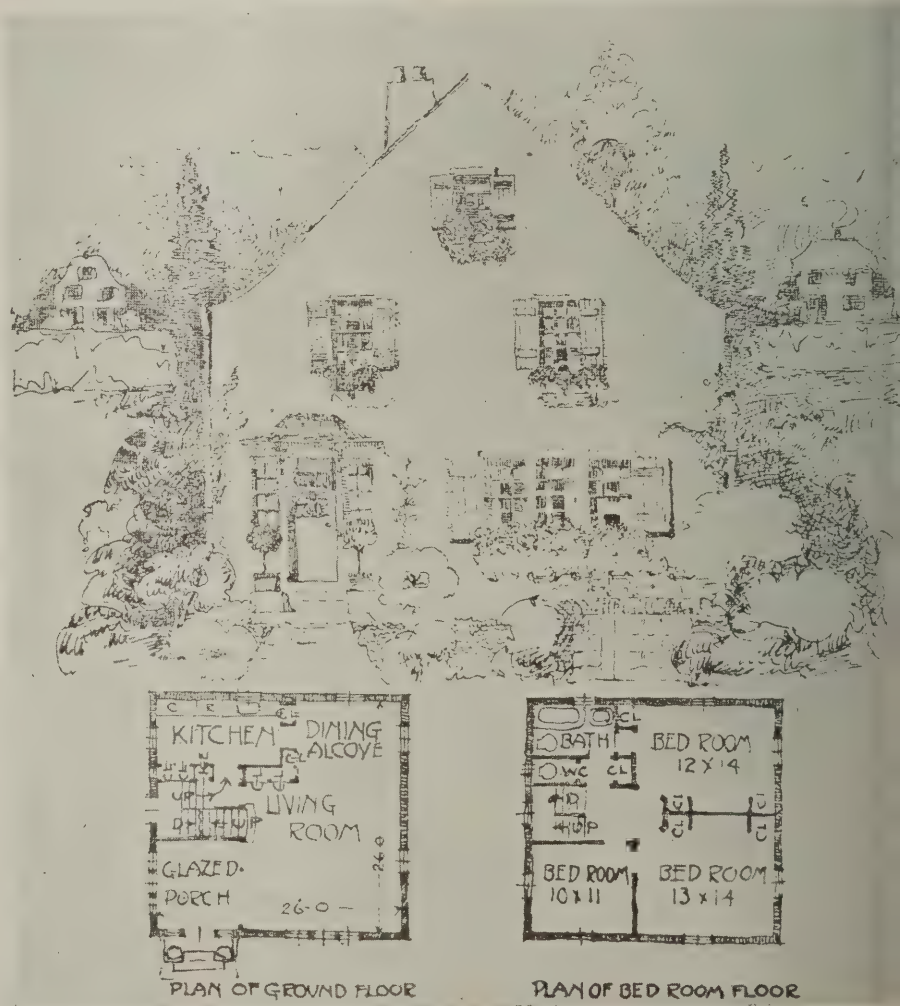
Bungalow built for Third Annual Own Your Home Exposition, held in Chicago, March 24 to 31, 1923



Reversed floor plan of the bungalow built for the Chicago show

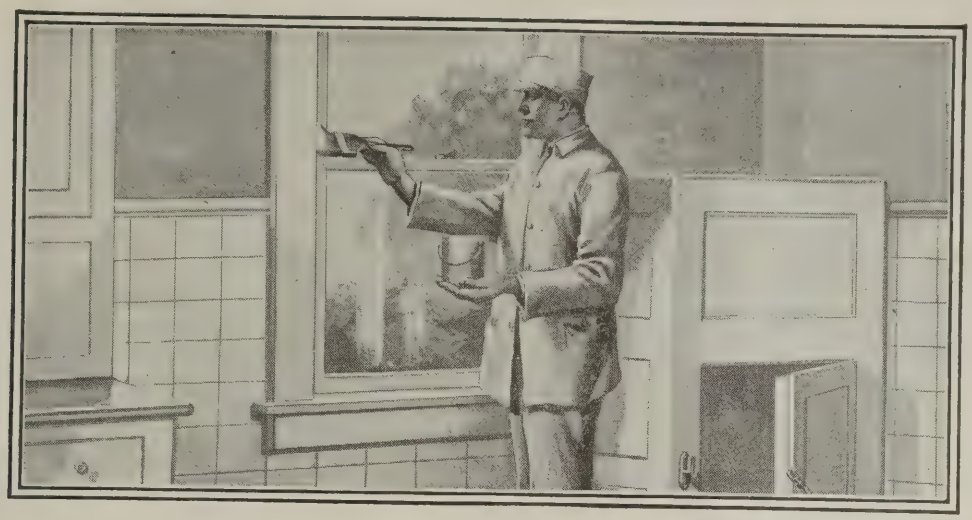
The full size five-room bungalow, feature of the Third Annual "Own Your Home" Exposition at the Coliseum, Chicago, Ill., March 24 to 31, 1923, was designed by R. C. Spencer, architect. It was achieved entirely through the efforts of exhibitors who contributed all materials and equipment used. It was built of a delicate ivory white shade of stucco, with light gray-green trim, and red terra cotta chimney pots, and was wired and piped for water and gas. The Holabird Construction Co., builders of th bungalow, report its cost at $8000, an state that it can be built as low as $780 It was stated that all furnishings and dec orations can be duplicated for $1200.

The following exhibitors provided mate rials and equipment for the bungalow Hartman-Sanders Co., sash, doors and trim Majestic Company, coal chute; David Lup ton's Sons Co., steel basement windows Andrew Hoffman Company, casement win dow hardware; Wisconsin Lime & Cemen Co., exterior stucco, Elastica and lath Ecod; Hawthorne Roofing Tile Co., con crete roofing tile; Kellog-McKay Company plumbing, bathroom fixtures and sinks Richards-Wilcox Company, finishing hard ware; Upson Company, wallboard; Wa Paper Guild of Chicago, wall paper; Mag nesite Products Company, composition floor ing; Andrew Hoffman Mfg. Co., wall saf



Design and plan for the full size house to be built for the Own Your Home Exposition to be held in New York City, April 21 to 28

For Light, Cheerful Rooms



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You can't do your best work with inferior materials—and your reputation and success depend upon *always* turning out good work. Build up a reputation as the best contractor in your locality—then you can get the price and will never experience a poor season.

Contractors who use Johnson's Artistic Interior Finishes soon find themselves getting more of the profitable, better class work. Johnson's Artistic Interior Finishes are right when they go into the can and they stay right. They do not change or deteriorate in any way.

You can give your customers the finest kind of a job by finishing both walls and trim with Johnson's Perfectone Undercoat and Johnson's Perfectone Enamel. These products will give equally good satisfaction on wood, plaster and metal. With them you can turn out perfect work—satisfy your trade and complete more jobs each season.

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It's the best book ever published on Artistic Wood Finishing—the work of famous experts—illustrated in color. This book is written for the practical man—it gives covering capacity, includes color charts, etc. We will gladly send it free and postpaid.

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Announcements and Publications

"Southern Pine Garages and How to Build Them," a booklet published by the Southern Pine Association, is just the thing for the man who builds frame garages. Many different designs are shown, from the small one-car garage to the two-story building with living rooms on the upper floor. Complete plans, together with quantity surveys, are given for each design, thus furnishing exact construction details to the builder. There is also included a table showing the various lengths of the standard makes of cars. The price of the booklet is 25 cents in lots of 25 or more, and separate plans may be had in lots of 50 at 1 cent each. Application should be made to the Southern Pine Association, 600 Interstate Bank building, New Orleans, La.

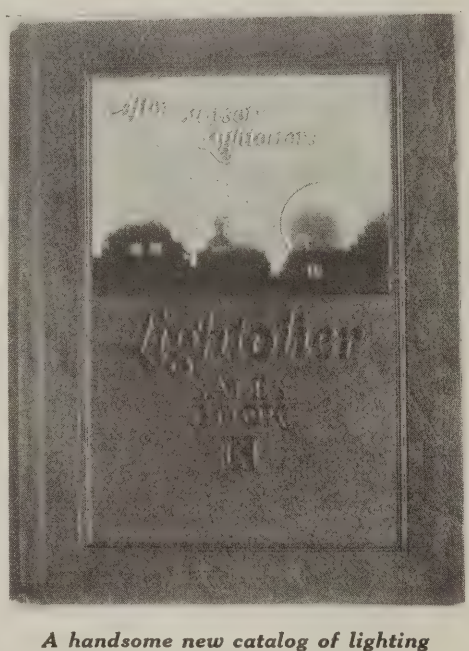
Architectural Metal Work—Throughout all history iron and bronze have done their bit in the beautifying as well as the strengthening of men's buildings. The crafts of bronze and iron have, however, been developed only with the last quarter century in the United States. The future is sure to see a greater and greater use of these worthy metals for ornamental as well as structural purposes. Let us hope that they are properly used by designers who know how to use them in good taste! A book of special details in iron and bronze executed by the Flour City Ornamental Iron Co., Minneapolis, Minn., is just off the press, beautifully printed and interestingly written. The designs are much more elaborate than any with which the ordinary builder is concerned, but they are good to look at and they inspire one to higher purposes.

The Wall and Ceiling Handbook—Another book for the layman but containing material of interest also for the professional builder. It comprises a number of articles by specialists along certain lines, all asking the question, "What's behind the plaster?" They answer it by telling why it is important to use metal lath. The booklet is distributed free by the Bostwick Steel Lath Co., Niles, Ohio.

Utica-Imperial Super-Smokeless Boilers—The Utica Heater So., Utica, N. Y., has issued this bulletin, which illustrates and describes "a remarkable development in boiler construction, utilizing the principle of the Bunsen burner and burning the cheaper grades of soft coal with great economy, the utmost efficiency and without smoke."

Aerolux Ventilating Porch and Window Shades, Awnings, etc.—Contractors and builders are awakening to the fact that they can add selling value as well as attractiveness and comfort to the house or apartment not naturally shaded and protected by trees by equipping such buildings with window and porch shades that admit both light and air but that keep out the heat. The line of ventilating shades manufactured by the Aeroshade Co., Waukesha, Wis., is particularly suggestive for these uses. Catalogs Nos. 61 and 90 published by this company contain many types and styles of interest. This concern also manufactures a complete line of awnings and office and factory shades.

"After Sunset—Lightoliers" is the title of the new catalogue just issued by the Lightolier Company, 569 Broadway, New York City. It is one of the most attractive books of its kind that has been published, containing 12 full page color plates and a total of 112 pages devoted to displays and descriptions of all manners of lighting fixtures, from simple wall and ceiling brackets to elaborate chandeliers, for practically every purpose. The catalogue is known as "Sales Book K" and is supplied upon request to all professional builders who are interested in lighting fixtures. The book is bound in imitation leather, heavily embossed and is 9½x12⅝ inches in size.



A handsome new catalog of lighting fixtures

"Questionnaire and Score Card Applicable in Choosing a Country Property," is the title of a pamphlet recently published by Dr. Wm. Paul Gerhard, C.E., a consulting engineer of New York. The purpose of this pamphlet is to assist the prospective home-owner in choosing a country site by means of rating the various advantages and disadvantages of the different locations under consideration, and giving each a certain number of points to be added in order to make a final grade. It is obvious that among different people different ideas regarding the desirability of a piece of property are bound to exist. Thus, some would consider accessibility of prime importance while others would deem recreation facilities deserving of the greatest attention. The score card is arranged to cover all such items as would tend to influence selection. Under such headings as physical conditions, climate, accessibility, water supply, streets and sidewalks, etc., are various questions which are to be answered, each to count a certain number of points for or against the particular heading under which they are given. When the grade for each heading has been determined, all are added together to make a final grade. Thus a positive comparison may be made between two or more different sites. The score card is quite flexible and is logically constructed. It should be a great help in the analysis of the desirability of a country homesite.

Allmetal Weatherstrip Co. Moves—The Allmetal Weatherstrip Co. have moved their plant and headquarters to 239 East Illinois Street, Chicago. Manager H. Herman states that the larger quarters are because of a growing demand for their weatherstrip. The plant is now busily engaged in turning out 1,000,000 ft. of zinc weatherstripping in anticipation of fall business. One of the points the Allmetal Weatherstrip Co., emphasizes to the contractor and builder is that they give 24-hour service.

Beckman-Dawson Roofing Co., manufacturers of Winthrop tapered asphalt shingles, have taken over the plant of the Peck Asphalt Shingle Co. at Detroit, Mich. This will give them increased facilities, and will enable them to make quicker shipments and give better service to the trade in Michigan, Indiana and the Ohio territory, where contractors and builders will also save in freight rates by having their roofing shipped from Detroit. Office space of the company has also been increased and the headquarters have been moved to the Austin Building, 111 Jackson Boulevard, Chicago, Ill.

Harrison P. Reed Now General Manager of the A. Kieckhefer Elevator Co.—Announcement is made by the A. Kieckhefer Elevator Co., Milwaukee, Wis., of the appointment of Harrison P. Reed, A. I. E. E., recently head of the elevator department of the Cutler-Hammer Mfg. Co. Milwaukee and New York, to the general management of the company.

RICHARDS-WILCOX R-W AURORA TRADE MARK

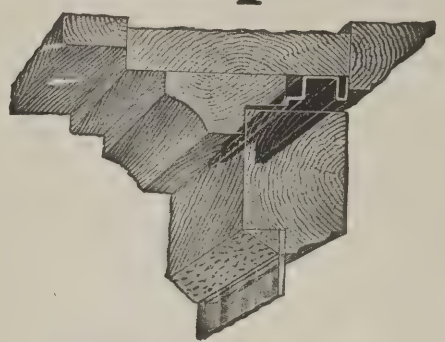
AIR-WAY TRADE MARK

Weather-tight Rattle-proof

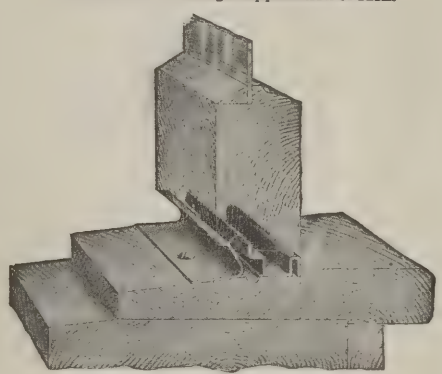
Most types of old-style windows are neither weather-tight nor rattle-proof. As a consequence, drafts and irritating window noises result.

Both these annoyances are prevented by the use of AiR-Way Multifold Window Hardware. The two upper illustrations at the right show why AiR-Way equipped windows fit snugly and are proof against wind and rain, while that below shows the parts which positively control each sash and eliminate slamming and banging.

Because of these exclusive features, builders everywhere agree that AiR-Way equipped windows are far superior to the many types of antiquated and inefficient windows now so generally in use. They also are unexcelled for durability and ease of operation.



Cross-section through sash and window frame at top, showing installation of AiR-Way track and the tight application of sash.



Cross-section through sash and window frame at bottom, showing installation of AiR-Way track and the tight application of sash. Note grooves in window sill and bottom of sash, which prevent moisture from seeping through.

Send for Descriptive Portfolio

We want every builder to be thoroughly acquainted with AiR-Way Multifold Window Hardware. Send for your free copy of our AiR-Way portfolio, H-G26, which contains many detail drawings explaining the installation and operation of AiR-Way. Remember, too, that our free engineering service is always at your disposal.

Richards-Wilcox Mfg. Co.

A Hanger for any Door that Slides

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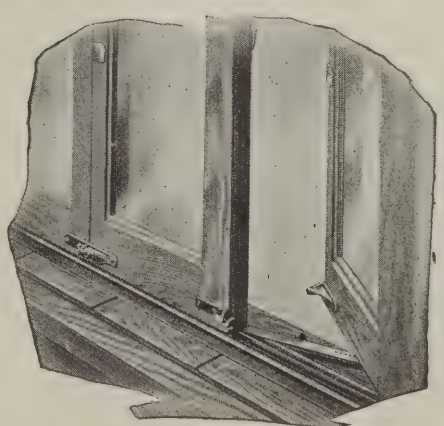


A link connects each sash, at top and bottom, with the sash adjacent. When the windows are open, or partially open, the links prevent them from slamming or banging. When closed, the safety locks hold them tight and prevent rattling.

RICHARDS-WILCOX R-W AURORA TRADE MARK

"The Construction of the Small House."—*Architecture* published serially a series of articles on this subject by H. Vandervoort Walsh, instructor of Construction in the School of Architecture, Columbia University, which have been gathered together under one cover and published in book form by Charles Scribner's Sons, New York City. The book deals with methods of construction, pointing out the right and wrong of such essentials as heating, lighting, plumbing, painting, roofing, trim, doors and windows. It is a book that contains a great deal of information that would be of value to the professional builder, as well as a guide to the layman who needs to know how to avoid mistakes and costly rebuilding. Numerous illustrations supplement the text and add to the attractiveness of the volume. It contains 269 pages, is 7½ x10¼ inches in size and priced at $5.00.

Architectural Monographs in Book Form.—National Builder is in receipt of a splendid volume from Russell F. Whitehead, Architect, 132 Madison Avenue, New York City, of Volumes VII and VIII of "The White Pine Series of Architectural Monographs" bound under one cover in attractive green cloth stamped in gold, making a book of some 200 pages, size 8⅜x10¾ inches. The book is sent postpaid for $3.00.

Simultaneously with the receipt of this book comes Number 1 of Volume IX of the White Pine series entitled, "Some Forgotten Farmhouses on Manhattan Island" containing, in addition to this material, the program of the eighth annual architectural competition for a rural library building.

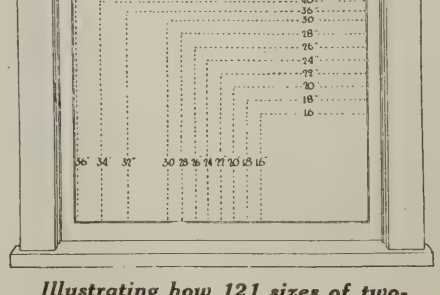
The building industry, and contractors, architects and builders especially, owe much to the publishers of this series of architectural monographs for the additions that they have made to our knowledge of early American architecture in general and to the architecture of various localities in particular. The publication of this series has done much to increase the appreciation of builders generally of houses of better design, and to encourage the proper use of architectural details in wood. These monographs are scholarly works and they deserve a permanent place in the professional libraries of all builders who appreciate the value of beauty in buildings.

Makers of Warm-Air Heaters Will Convene—The tenth annual convention of the National Warm Air Heating and Ventilating Association will be held in Cleveland, Ohio, at the Hotel Winton, April 18 and 19, 1923. The program as announced by A. W. Williams, secretary of the association, relates to both the commercial and engineering phases of the industry. "Cost-Finding Methods in the Furnace Industry," by R. G. Bock; "Fans as Applied to Warm Air Heating," by R. W. Menk, and "The Merits of Warm Air Heating When Properly Installed," by E. A. Stewart, are the subjects of three papers that should be of unusual interest.

"Clean Up and Paint Up" Campaign Is Started—Advance information sent out by the National Clean Up and Paint Up Campaign Bureau, Pontiac Building, St. Louis, Mo., reveals some interesting literature de-

signed to prolong clean up "day" or clean up "week" into a "campaign." Free circulars, newspaper cuts, etc., are offered to those who will use them. Many of these cuts are of cartoons, which depict the idea in amusing but at the same time forceful manner. Some are by the famous cartoonists, Briggs and Chapin.

Andersen Window Frames—The first articles of millwork on the job are the frames. If they are late, the job gets off to a bad start, and unless the dealer has a good stock of frames always on hand, the builder has nothing to fall back on. But can the average dealer afford to carry a stock of frames? What about the sizes? How about frames for different types of walls? Are factory-made frames more expensive than frames made on the job? These questions and many others are all answered in a clear, concise, convincing manner in a booklet by the Andersen



Illustrating how 121 sizes of two-light window frames can be made out of a stock of 11 standard sizes

Lumber Co., South Stillwater, Minn. Better frames that cost less; a frame up in 10 minutes; Andersen frames prevent costly delivery delays; made of genuine whi pine; a style for every purpose; for ma types of buildings; many sizes for ma uses; seven parts instead of 57; ho Andersen frames are used in special co struction; how they are made; cellar sa frames—these are the chapter headin and cuts and tables illustrate the poi brought out.

City Planning and Zoning is one of t most important subjects of the hour a is receiving a great deal of attention municipalities of all sizes varying fro New York City, the largest city in t world, to villages with only a few hundr inhabitants. This fact is a hopeful si of the times, for it is high time that o urban communities gave some attenti to the matter of proper layout and t control of building programs. Accordi to the 1920 census 51.4 per cent of t people in the United States live in urb communities (that is, towns and cities more than 2,500 inhabitants), and t tendency of population growth is stead toward the city.

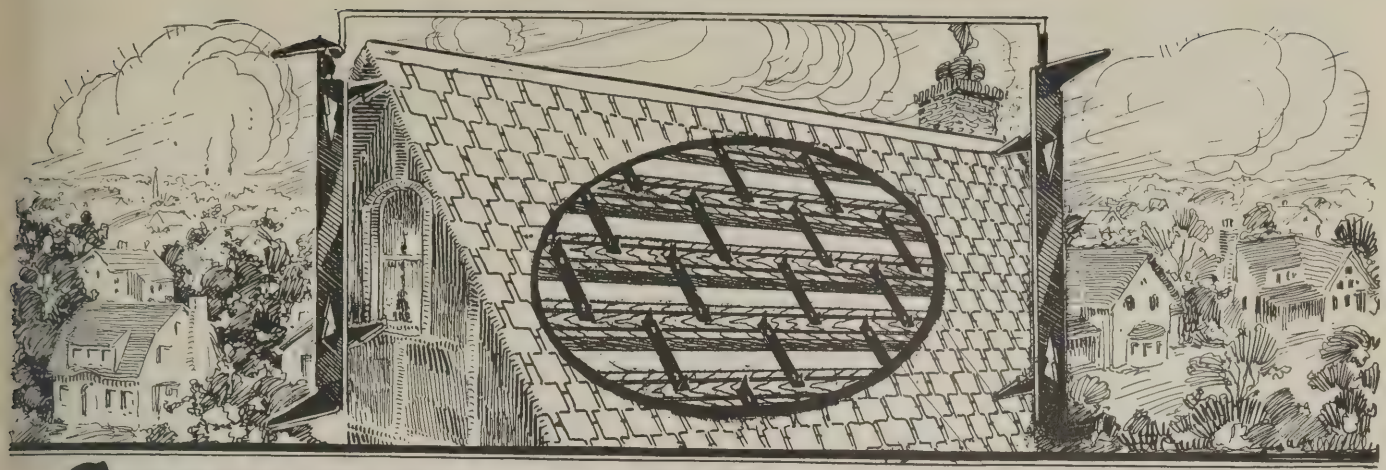
Frank Backus Williams, A. M., L. B., a member of the New York Bar, h written a pioneer work in this field e titled "The Law of City Planning a Zoning," which is published by The Ma Millan Company, New York City. T author has acted as the representative New York City abroad, and the consu ant of many cities in this country, a writes from his own knowledge of t theory and practice of the branch of l profession to which for many years has devoted himself. The book is n only of interest to the student of civi and land economics, but of service in l daily work to the city official, the arc tect, the builder, the owner and dealer real estate, the legislative draftsman, a the lawyer.

The book contains 738 pages, is 6½ 8⅞ inches in size, and price $5.00.

Hardware Manufacturers Meet—Mo than 300 bona fide hardwood produce representing about a third of the hardwo lumber manufactured in this country, w get together at the first annual conventi of the Hardwood Manufacturers' Institu to be held on May 10 and 11 at the Blac stone Hotel, Chicago.

The institute was organized in June, 19 with but 70 members, and already clai many noteworthy accomplishments to credit; as for example, the first institu lumber inspection force of three men is n increased to an inspection corps of 12, gi ing service upon call whether the part desiring an official inspection be members the institute or not.

Prominent speakers will address the co vention, representing outstanding hardwo consuming interests, figures of natio prominence in politics, government and ge eral business, authorities on general a technical phases of the lumber industry.



SERVICISE YOUR ROOFS

Servicised Giant Shingles

Servicised Mammoth Shingles

Servicised Interlock Shingles

Standard Individual Shingles

4 in one Strip Shingles

Servicised Insulation Wool

Servicised Pipe Covering

Servicised Asbestos Furnace Covering

Concrete Floor Paint

Shingle Stain

The Servicised Shingle Span

Servicised Products, from the top to the bottom of the list, are first of all quality products, representing the highest development in their respective lines.

The application of this span is shown in the engraving above. These little metal spans assure a ventilated, non-sweating, non-rotting, heat-resisting and cold-insulated roof at a saving on laying costs of better than $3.00 per square. Slate and Asbestos Shingles can also be laid by this new method at a low cost. Try them on your next roofing job.

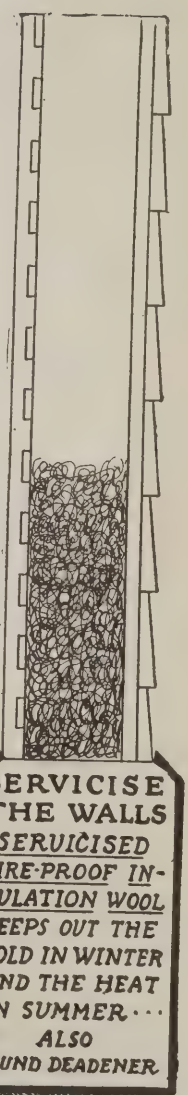
Inter-Lock Shingles

This is the greatest value that has been developed since the introduction of asphalt shingles.

When laid, the artistic interwoven pattern makes a roof unusually artistic and beautiful in design, and the lock-ends positively prevent shingles blowing up in the wind.

SERVICISED PRODUCTS

Our Pipe Covering, Asbestos Furnace Covering, Concrete Floor Paint and Shingle Stain all contribute their share to comfort, convenience and economy; and if you are buying on the basis of real value, it is only necessary to investigate Servicised Products in detail, and compare them with any other product of similar nature on the market.


SERVICISE THE WALLS
SERVICISED FIRE-PROOF INSULATION WOOL
KEEPS OUT THE COLD IN WINTER AND THE HEAT IN SUMMER···
ALSO SOUND DEADENER

SERVICISED PRODUCTS Co.

First Nat. Bank Bldg. Chicago, Illinois

SERVICISED LOOK FOR IT ON ALL PURCHASES

C 1920

Servicise the Cement Walk and Basement with SERVICISED EXPANSION JOINTS

Buyers' Guide for Builders

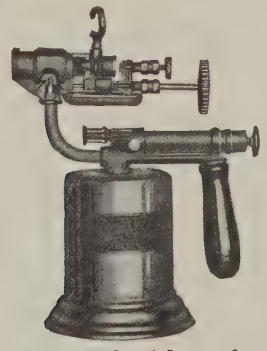
What Manufacturers of Materials, Equipment and Machinery for Building Construction Are Doing for the Industry

A Blow Torch with Safety Valve

A NEW blow torch, now being marketed by the Turner Brass Works, Sycamore, Ill., embodies a number of novel, useful and interesting patented features.

Its makers claim that it is the only blow torch with a safety valve. This valve, located at the end of the horizontal pump cylinder, is fitted with a diaphragm accurately proportioned to give away automatically at 40 lb. air pressure. A thumb-nut on the valve permits the operator to release the air pressure, after his work is done, or to decrease pressure as desired during the operation of the torch.

Another exclusive feature, it is claimed, is the fact that there is but one opening in the tank. This opening is at the top, above the fuel line, and is sealed by a screw-thread filler plug. By eliminating such soldered



A blow torch with a safety valve

connections as burner inlet and upper and lower pump brackets, a frequent cause of leakage, trouble is removed.

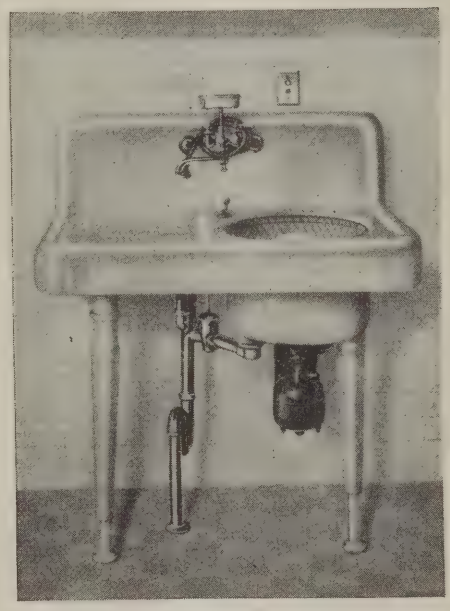
The pump is equipped with a pump leather that spreads like a parachute on the work-stroke and, like a parachute, closes on the return stroke. The leather is automatically lubricated from a reservoir of vaseline in the brass washer at the end of the pump rod. These features tend to insure maximum labor.

The fuel, in its journey from the tank to the combustion chamber, passes through the interior of a solid bronze baffle, which its makers call the "hot spot hump." This baffle is located near the outlet of the burner tube, in the path of the flame. It very soon becomes white hot, the intense heat vaporizing the fuel into a hot, dry highly-inflammable gas. The makers claim that their torches can burn kerosene or the leanest grade of gasoline, generating a heat some 400 degrees higher than ordinary torches secure from high test gasoline.

The Turner safety blow torch is built in a variety of sizes and types for various purposes.

In-the-Sink Dish Washer

"TAKE your dishes off the table, put them in the sink, press a button and—they're washed." So states the circulars describing the latest product of the Sani Sink Dishwasher Co., 209 West Randolph Street, Chicago, Ill. This unusual piece of household equipment is a dish washing machine placed right in the sink as a part of the sink itself. A basket to hold dishes can be lifted out. An electric motor beneath the sink rotates a "Gush-a-tor," which is shaped



A sink dish washer that is being widely used in houses and apartments built to sell and to rent

much like a propeller on a motor boat, and which throws the water up into the metal cone, spraying the dishes through the perforated sides of the cone and from a deflector at the top. The same spigot that serves the sink fills the dish washer and the latter is emptied through the same drain pipe by releasing a drain control.

This dish washer is finding favor among builders of apartments and houses built to sell and to rent. They claim it adds to the selling and rental value of a building, because of its strong appeal to the housewife, who, in the small apartment or house, usually does her own housework.

Built-in Mail Box Prevents Theft

O. O. KOLSTAD, Duluth, Minn., is the inventor of a new built-in mail box which has received the official approval of the postal authorities at Washington, and which is adaptable for both city and rural use.

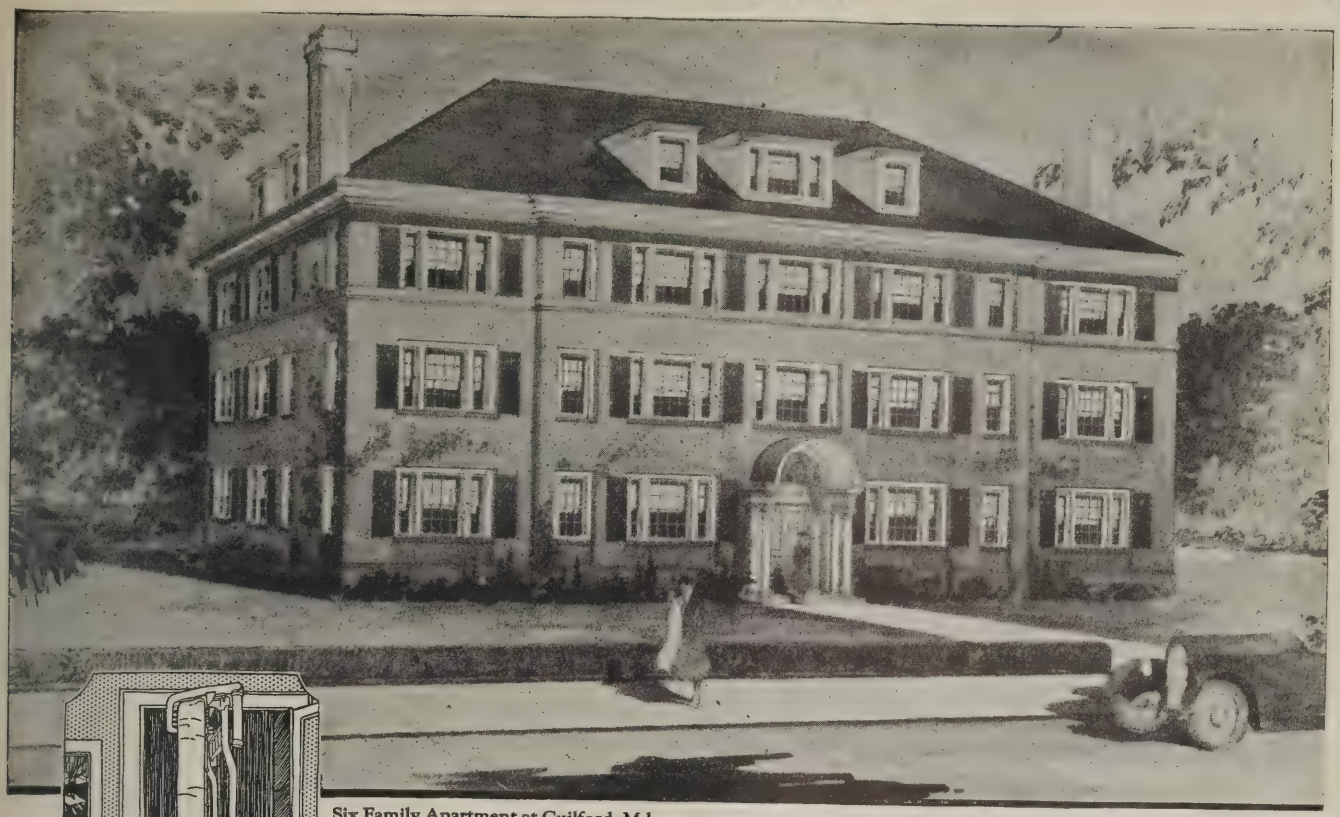
The illustration shows the box built into a brick wall, as it would be used for city houses. For rural routes the same box, but of heavy galvanized construction, is mounted on an ordinary wooden post. It contains a storm-proof flap and a spring is provided within the mouth to hold outgoing mail. A pivoted deflector plate permits incoming mail to be dropped down into the box proper, but prevents removal of the same through the mouth of the box. The mail is removed through a drop

Built-in mail box as installed in a private house

door at the bottom of the box that can be locked with a padlock.

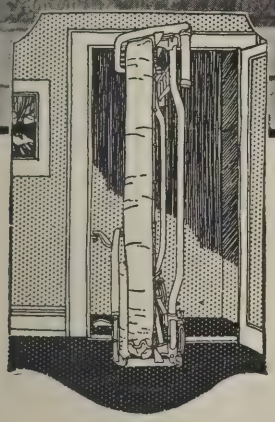
For a box inside the house, the door through which the mail is removed and which is the only exposed part inside the house, is of birch and can be finished to match the wall of which it becomes a part. For use in lobbies of apartment buildings the delivery door opens through the same wall as the mouth of the box.

The box is large enough to contain practically any catalog issued and holds considerably more than the average volume of mail received by the average individual or small firm.



Six Family Apartment at Guilford, Md.

Roy G. Pratt, Architect, Baltimore



The Double Appeal of the Murphy

THE economy of providing extra bedroom space without extra building cost is reason enough for the builder to to install Murphy In-A-Dor Beds.

Add to this the convenience it gives the tenant of having one room serve as two without loss of comfort.

Because of this double appeal, to builder and tenant, Murphy Beds are frequently specified as Standard equipment for hotels, apartment houses, and private homes.

The building shown above is typical of six erected by the Joint Owners Construction Co. of Maryland. One Murphy Bed in each apartment is a vital factor in the sale of these buildings on the popular tenant-ownership plan. Wire or write for full information.

Our Technical Department

is always at the disposal of builders and architects. Let us cooperate with you on your layout problems. May we send you full information and examples of Murphy In-A-Dor Installations?

Offices

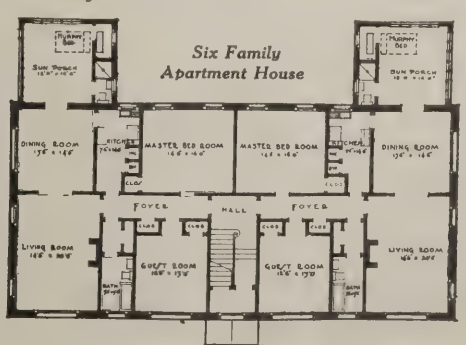
22 West Monroe Street, Chicago
469 5th Avenue, New York
1534 Blake Street, Denver
912 Kresge Bldg., Detroit, Mich.
205 O'Connor St., Ottawa, Can.
Crocker Bldg., San Francisco
Chemical Bldg., St. Louis
Hoge Annex Bldg., Seattle, Wash.
1140-42 Hanna Bldg., Cleveland
1021-23 Grand Ave., Kansas City
220 N. St. Paul St., Dallas, Tex.
204 Peach Tree Arc., Atlanta, Ga.
309 Third Ave. N., Nashville, Tenn.

The Murphy Cabinet Ironing Board is meeting with enthusiastic approval. Ask about it.

The MURPHY IN-A-DOR BED

OFFICES AND DISPLAY ROOMS IN ALL PRINCIPAL CITIES

There is only one In-A-Dor Bed—"The Murphy"



Typical Floor Plan

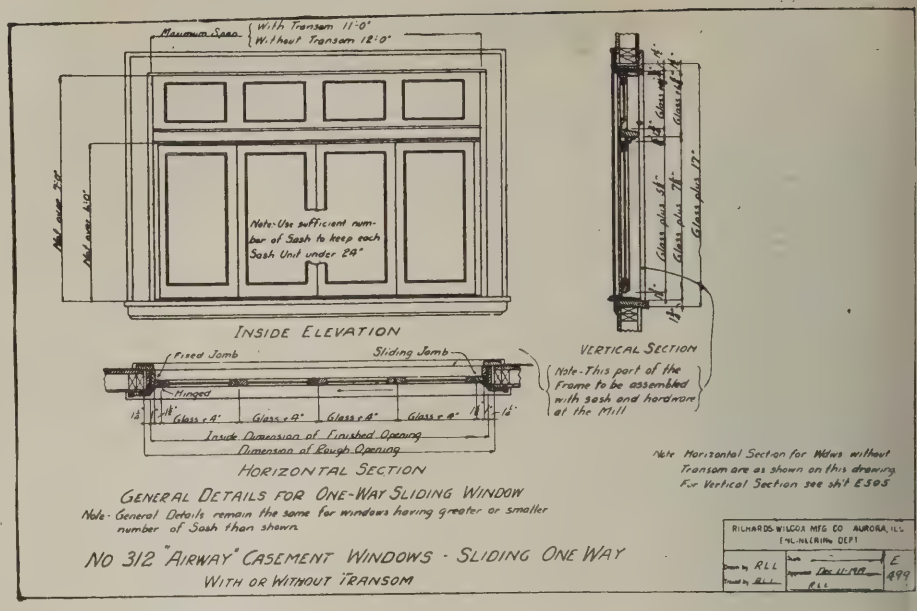
Casement Windows for Wide Openings

ONE of the distinctive features of American small house architecture is the open porch. Originating in the South, it has become so popular in all sections of the country that the house without a porch of some kind is a rarity.

Many builders are taking advantage of a special type of casement window for the purpose of enclosing open porches and making them usable the year round. These windows have the advantage of permitting the full use of openings as wide as 11 ft., yet it is claimed for them that they are storm-tight and permit easy ventilation, and do not interfere with screens.

These windows are made possible by the use of "AiR-Way" window hardware, manufactured by the Richards-Wilcox Mfg. Co., Aurora, Ill. This hardware permits the sash to open inside and does not interfere with screens, which may be applied to the window frames in the same manner as to ordinary windows that operate vertically. Wind and draft will not blow through the sash equipped with such hardware, it is claimed, and the sash stand immovable in any position, open or closed, without locks or holders.

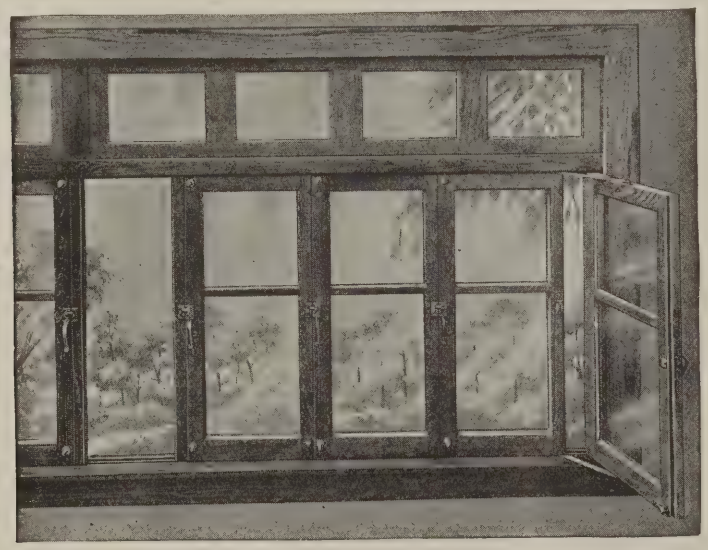
The illustrations show how the hardware and sash are constructed and how they operate. The sash opening in are easily washed. The "AiR-Way" window hardware gives an opportunity to throw open the entire window frame, or one sash at any particular point in the string of sash, or any number of sash desired. The windows may be placed in such a position that the wind will not blow directly into the room. The windows may be constructed with stationary mullions or moving-split mullions, part of the sash moving to the right and part to the left, or they may be arranged to move all in one direction. When wide open the sash are held together at an angle against the casing at each of the windows, leaving practically all of the window opening clear of obstruction.


Maximum Span { With Transom 11'-0" / Without Transom 12'-0"
Note-Use sufficient number of Sash to keep each Sash Unit under 24"
INSIDE ELEVATION
VERTICAL SECTION
Note-This part of the Frame to be assembled with sash and hardware at the Mill
Fixed Jamb
Sliding Jamb
Hinged
Glass 24"
Inside Dimension of Finished Opening
Dimension of Rough Opening
HORIZONTAL SECTION
Note Horizontal Section for Units without Transom are as shown on this drawing
For Vertical Section see sht E505
GENERAL DETAILS FOR ONE-WAY SLIDING WINDOW
Note-General Details remain the same for windows having greater or smaller number of Sash than shown
NO 312 "AIRWAY" CASEMENT WINDOWS - SLIDING ONE WAY
WITH OR WITHOUT TRANSOM
RICHARDS-WILCOX MFG CO AURORA, ILL.
ENGINEERING DEPT
E 499

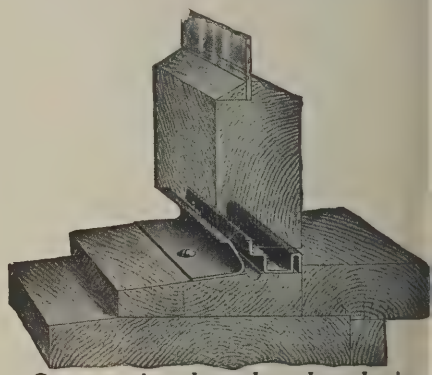
part of the sash moving to the right and part to the left, or they may be arranged to move all in one direction. When wide open the sash are held together at an angle against the casing at each of the windows, leaving practically all of the window opening clear of obstruction.

The hardware can be applied to any number of sash the builder may want to place in a row, but not more than six sash should be installed to form a string sliding one way, according to the recommendations of the manufacturer. The height of the window does not affect the operation of the hardware, but the hardware is designed for sash not more than 12 sq. ft. in area and the maximum width of each sash not to exceed 24 in. Openings as wide as 11 ft. for windows having transom sash when a standard design of transom is used, or 20 ft. for windows having no transom sash, are possible. Larger sash require special construction. When transoms are installed shades may be fastened to the transom sash without transoms, shading may be attached directly to each sash.

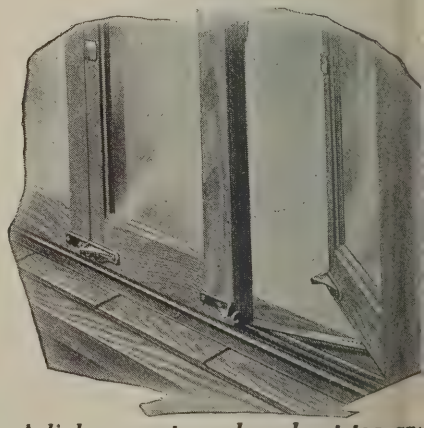
It is to be understood that this same type of hardware can be used for casement win



Showing how the "AiR-Way" link opens each window. In each series of sash the sash hinged to the window casing opens first. Then the remaining sash slide toward this end as they are opened



Cross-section through sash and window frame at bottom, showing installation of track and the tight application of sash. Note grooves in window sill and bottom of sash, which prevent moisture from seeping through



A link connects each sash, at top and bottom, with the sash adjacent. When the windows are open, or partially open, the links prevent them from slamming or banging. When closed the safety locks hold them tight and prevent rattling

MAGNESTONE
RED-E-ALL
STUCCO

Ready for the job
Mix with water

Here is the new Red-E-All package—Magnestone Stucco ready to mix with water. No binder tanks, no hydrometers, no surplus equipment necessary.

This is just the time-saving, labor-reducing, practical stucco you have wished for.

Each bag of Red-E-All Stucco has the necessary quantity of binder packed right in it. The binder is contained in the cartridges which you see in the illustration. This method of packing prevents the binder from fusing with the stucco before you are ready to mix.

Red-E-All is the same reliable Magnestone Stucco which has been used successfully on thousands of jobs. It's ready to mix with water and apply.

Shipped in neat or sanded form.

Manufactured for smooth and dash finishes.

Magnestone is the easiest stucco to mix and the smoothest to apply.

Write for samples, specifications and literature today.

AMERICAN MAGNESTONE CORPORATION
Springfield, Illinois.

PLANTS:
Ottawa, Ill. ∿ Springfield, Ill. ∿ Kansas City, Mo. ∿ Minneapolis, Minn.
New York, N. Y. ∿ Detroit, Mich.

MANUFACTURERS OF—Magnestone Composition Flooring—the most practical and artistic floor for the home and public or commercial buildings [furnished in eleven colors]—also Smith's Colonial Mortar Colors, Magnestone Interior Plaster and Water Proofing Materials.

Sold by building material dealers everywhere.

MAGNESTONE
RED-E-ALL
STUCCO

Easy to handle—
Easy to sell.

dows for any opening in any part of the house.

The manufacturers have published a booklet, "Modern Hardware for Your Home," which describes the "AiR-Way" casement hardware in detail, showing the construction features and giving suggestions for the operation and use of windows equipped with this hardware.

Standardized Concealed Beds

AS land values go up, houses necessarily become smaller. Rooms have to be smaller or else fewer in number unless a new way of utilizing floor space and wall space can be found.

In recent years, built-in items of household equipment have enjoyed a tremendous

A special tilting device applied to an ordinary metal or wood bed makes a closet bed. Note the box spring

popularity. Probably the most common of all these space-saving articles is the concealed or closet bed. A number of such beds are on the market today and the use of them has enhanced the rental and sales values of many houses and apartments and has made more comfortable and roomier homes for many families who otherwise could not have been so well accommodated.

The latest development in a concealed bed has just been announced by Loeb & Smith, Inc., Garland Bldg., Chicago, Ill. This new bed is now reaching quantity production and sales agencies are being established throughout the United States, with distribution facilities adequate for handling a large demand and for serving builders in all parts of the country.

Mr. A. W. Smith, a member of the firm, has had years of experience in the door bed business and has made a special study of space-saving equipment for small houses and apartments.

"We have perfected," says Mr. Smith, "a standard bed that can be tilted and concealed. We have taken a regular bedstead of wood or metal and, without castings of any kind, have applied an apparatus for tilting it and fastening it to a door to make a closet bed out of it.

"The Smith door bed is thoroughly standardized, conforming to the standard specifications of the bed and bed spring manufacturers. The foot and head end of the Smith bed is the same height, width and design as a regular bed. The spring can be link-fabric, coil or box, of any standard make, and the bed when down is of standard height from the floor to the top of the mattress.

"It is balanced by helical springs on a rocker system of lifts, which enables it to balance at any position without the possibility of dropping or closing up, and when it is in position for use the bed is automatically locked and solid to the floor. It can be handled by a child.

"The Smith door bed is assembled complete at the factory ready for fastening to the door of the closet in which it will be contained. It can be detached from the door and moved as a regular part of the furniture, if so desired. Some builders construct houses and apartments with closets, but allow their tenants to furnish their own Smith door beds along with the rest of their furniture.

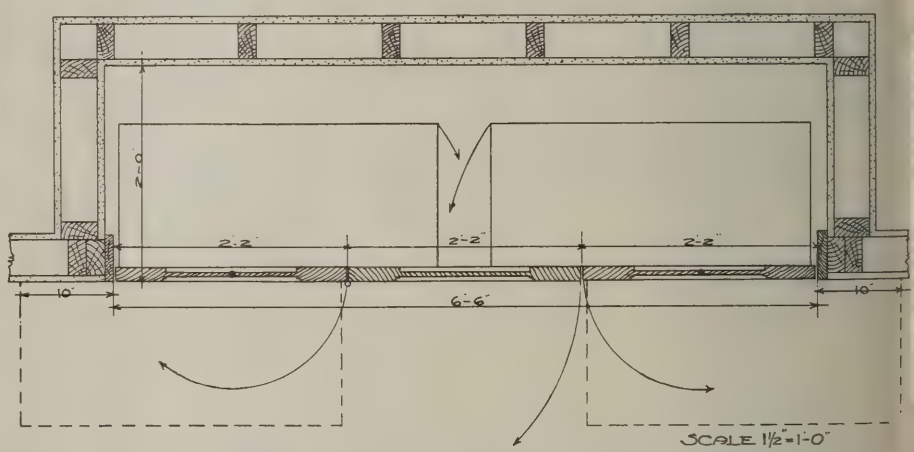
"This bed is so standardized in all its features that it can be handled by any furniture store as a piece of merchandise rather than as a specialty or mechanical device, and it can be installed or attached or removed by any carpenter."

According to the manufacturers, the buyer of a Smith door bed can have practically any design of bed selected from the catalog of any furniture manufacturer. This is an important feature, for the bed can be chosen to match the rest of the bedroom furniture. Since a standard bed is used, the Smith door bed does not present the appearanc of being a mechanical device.

The bed is commonly installed in a close with two doors. When it is out in th room, both doors can be closed, shutting o the closet. The head of the bed fits snugl up against the door when the bed is out i

The head of the bed is solidly against the door

the room; therefore, it requires less floo space than any other closet bed, it is claimed The diagram shows a typical installatio for a set of twin beds. The demand fo twin beds, says Mr. Smith, is increasin rapidly and taking precedence over th sale of double beds, not only for hotel and clubs, but also for individual resi dences and apartments.



A typical installation for a pair of twin beds. Standard sizes of any design door can be used

A feature of the Smith door bed whicl is of practical importance is the fact tha it can be used with any standard door o any design. The door need not be made t order and it is not sold with the bed Standard doors, 2 ft. 4 in., or 2 ft. 6 in wide by 6 ft. 8 in. high, are recommende for the full size bed, which is 4 ft. 6 in wide and 6 ft. 6 in. long over all. The standard twin bed is 3 ft. 3 in. wide.

Loeb & Smith, Inc., announce for early distribution a catalog of unusual characte which will be supplied to dealers, contract ors, architects, builders and all who ar interested in space-saving equipment.

ASBESTONE

EVERLASTING MAGNESITE STUCCO

"Treasury of Atreus" at Mycenae.

The Story of Stucco

Pausanias, the Greek, over 2,000 years ago, saw and wrote about the "Treasury of Atreus" at Mycenae. "The doorway was flanked by columns of alabaster, the facaat very richly decorated, and the inside ornamented with attached bronzes" — and investigations of a later date have shown that Stucco played no small part both in interior and exterior finish. Stucco, in fact, was thought worthy of use in the most magnificent buildings, although far from being so perfected in substance as it is today. If the ancient builder had only had ASBESTONE—the perfected form of Stucco—to work with———!!

Stucco of Quality

The ideal exterior Stucco plaster for all classes of buildings

ASBESTONE EVERLASTING STUCCO has gone forward step by step to a position of unquestioned leadership, due simply to the fact that it is undoubtedly the most highly standardized Magnesite Stucco manufactured, and the service it has given its users. Can be applied to wood, hollow tile, cement, brick, etc.

Unsurpassed in Covering Power
Unequalled in Tensile Strength and Resiliency
Fireproof, Weatherproof and Durable

Hundreds of artistic Stone Dash finishes to select from

Stocked by the leading Building Supply Dealers throughout the country. If your local dealer is unable to supply your wants, write direct for full particulars, prices and samples.

Franklyn R. Muller & Co.

Stucco and Composition Flooring Manufacturers

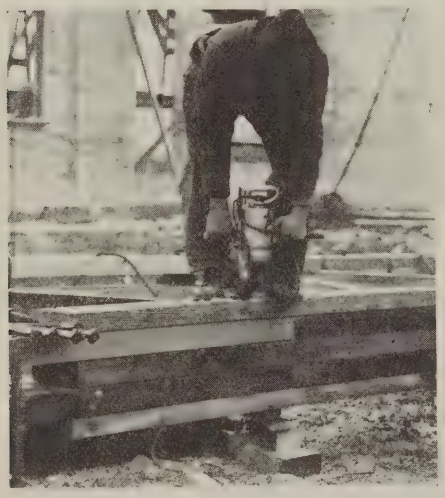
444 Madison Street
Waukegan, Ill.
Established 1906

Portable Electric Wood-Boring Drill

A PORTABLE electric drill designed to bore holes in wood of unusual great depths at high speed, is the latest addition to the very complete line of portable electric

Ready to start a hole

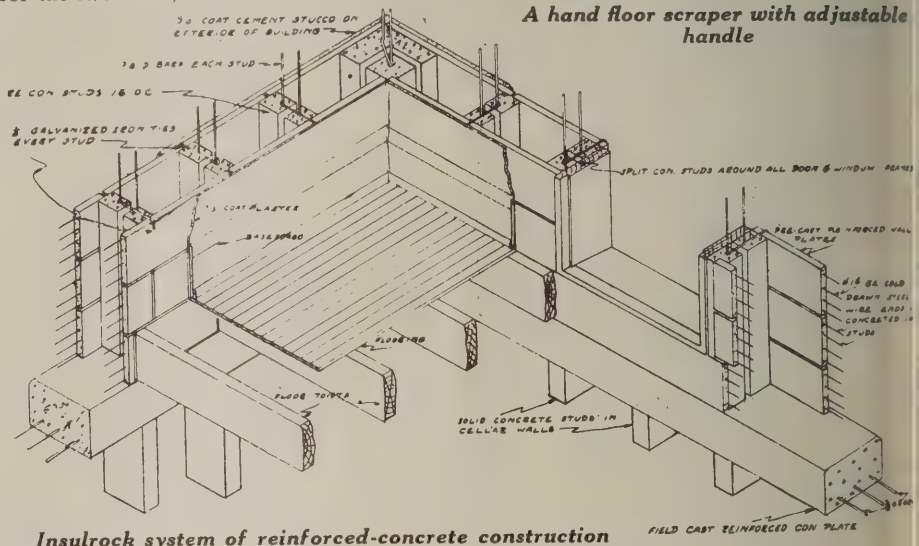
drills, grinders and buffers manufactured by the Wodack Electric Tool Corp., 23-27 South Jefferson Street, Chicago, Ill. This drill is useful in erecting all heavy timber structures, in making lattice roof trusses, and for many other purposes. It is equipped with a quick make-and-break switch, removable side handles, universal motor, ½-in. Jacob's chuck and 10-ft. cord and plug. Its length overall is 18 in. and net weight 18 lbs.



Boring through five 3-in. boards of fir in 28 seconds

Insulrock System of Reinforced Concrete Construction

WILSON & GRAMM, consulting engineers, Electric Building, Buffalo, N. Y., have recently developed and patented a moulding device for making hollow reinforced concrete walls with one or more air spaces for insulation. The wall consists of precast reinforced concrete slabs or plates for the two faces, to the backs of which are


3/4 COAT CEMENT STUCCO ON EXTERIOR OF BUILDING
FLOOR JOISTS
SOLID CONCRETE STUDS IN CELLAR WALLS
FIELD CAST REINFORCED CON PLATE

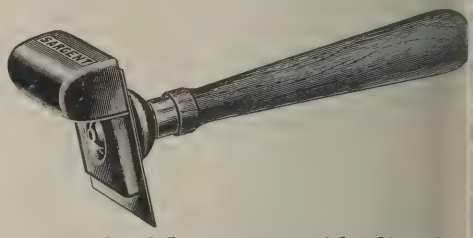
Insulrock system of reinforced-concrete construction

field cast reinforced concrete studs, usually spaced 16 in. apart and made either solid or split. Horizontal reinforced concrete beams at each floor level, cast monolithic with the studs both above and below, extend around the structure and, with the studs, form a complete structural frame. Stucco or plaster is applied to the roughened precast concrete plates. This system is known by the trade name of the "Insulrock System." Walls of any thickness and studs of any size or spacing may be made; consequently the system conforms to good engineering practice and design. The Insulrock System is adaptable for any building construction.

The drill in use by McKeown Bros. Co., Chicago, in making roof trusses. The gasoline engine is belted to a generator for supplying current when electricity from other sources is not available

Adjustable Hand Floor Scraper

ALL four edges of the reversible blade in this hand floor scraper can be used without removing the blade from the clamp. It is only necessary to loosen the handle sufficiently to turn the blade until the new cutting edge is in position. The handle is set on a universal joint and can be readily adjusted to bring the cutter to any position desired. The scraper is a new product of Sargent & Co., New Haven, Conn.



A hand floor scraper with adjustable handle

Steel Scaffold Brackets

"I CARRY my own staging and do not make kindling wood of high-priced lumber. I have 112 ft. of ladders and do not stop to make them on the job." Thus does S. F. Black, contractor and builder in New London, Ohio, advertise himself. These are good talking points, too. Many contractors and builders are adding regular scaffolding outfits to their building equipment. The factory-made steel scaffold bracket has come to stay. It is stronger and safer in every way and more convenient and economical than the wooden bracket made on the job. The safety code which the building trades department of the Federation of Labor of Ohio is hoping to have adopted by the Industrial Assocation of that state, is almost wholly directed at scaffolding in an effort to prevent accidents by breaking scaffolds.

Strength of Steel Scaffolds

The "Reliable" scaffold bracket, made by the Elite Mfg. Co., Ashland, Ohio, is

Fire-Tight for One Hour

Wood construction *can* be made fire-safe. After severest tests, the Underwriters' Laboratories have given metal-lath a *full one hour* rating.

The wooden supports of walls and ceilings, when protected by plaster and fire-resisting Herringbone, will stop the spread of fire beyond the room of origin for at least one hour.

Fire-safe, rigid, crack-preventing, self-furring, economical—these qualities are drawing far-sighted architects and builders everywhere to specify Herringbone.

Send for illustrated literature

Other GF Materials

Self-Sentering—A combined form, lath and reinforcement.

Trussit—A reinforcement for solid partitions.

GF Expanded Metal—A concrete reinforcement.

GF Steel Tile—For concrete floors.

GF Steel Lumber—Used in place of wood joists.

GF Steel Channels—Studding for solid partitions.

GF Waterproofings.

Herringbone
Rigid Metal Lath

THE GENERAL FIREPROOFING CO., *Youngstown, Ohio*

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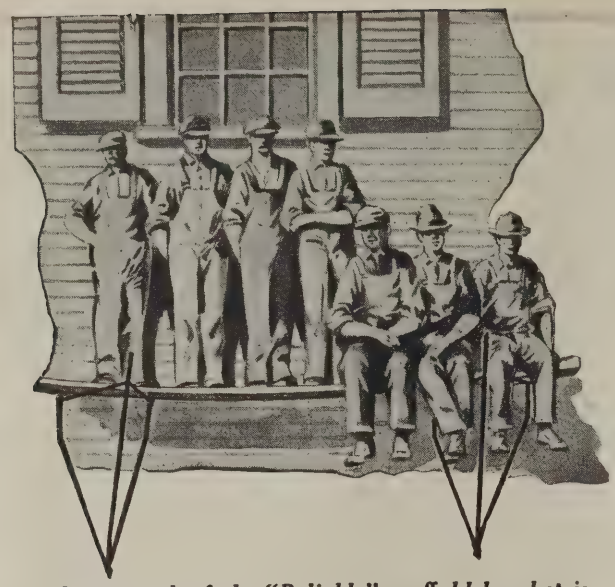
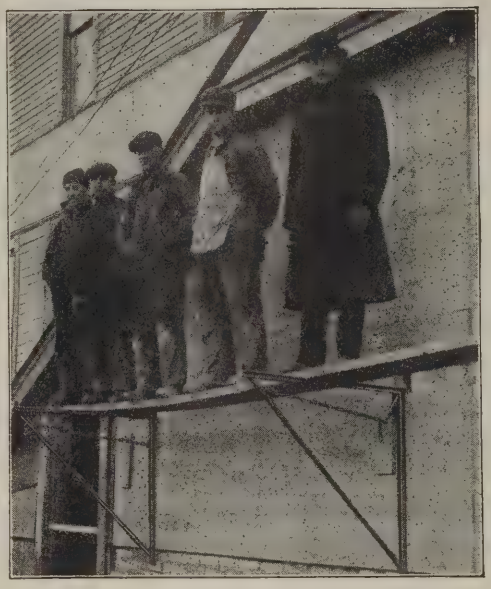
Export Department, 438 Broadway, New York City Cable Address—"Genfire New York"



The strength of the "Reliable" scaffold bracket is more than sufficient for every requirement

a bracket very popular among contractors and builders of smaller buildings like houses, apartments, barns, etc., because of its economy of time and labor on the job and its practical construction. "One contractor," says J. W. Tribley, sales manager of the company, "writes us that he saved $75 on a house job by using Reliable brackets. He was able to underbid other contractors because of them." Mr. Tribley states that there are Reliable brackets in use today that were bought eight years ago. The above picture is from a photograph sent in by Ollerman & Yeldon, contractors, of Yeldon, S. D. It shows two Reliable brackets put up with 8-d nails, supporting seven men (about 1150 lbs.) on a 16-ft. plank. It is claimed that two men can put up a nine- or ten-scaffold bracket in one hour, and that all that is required for the purpose is a hammer and a few 8-d nails. Shifting is easy; the brackets are raised as the job progresses.



The heavier the load on the "Quick-Set" the tighter it clings to the wall

The "Quick-Set" bracket hooks into the sheathing

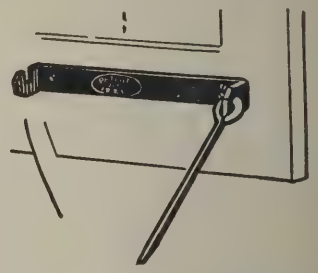
The "Quick-Set" Hooks On

Another steel scaffold bracket has just been put on the market by the J. L. Austin Mfg. Co., Menomonee Falls, Wis. This bracket is called the "Quick-Set" because it is claimed it can be put up in a jiffy, requiring no nails. The bracket consists of a top bar of two pieces of steel, ⅞-in. by 1⅜-in., riveted together. The angular support bar is 1-in. by 1-in. tee steel. The perpendicular bar is made of two pieces of 1-in. by 1-in. angle steel. A steel hook in the right angle of the bracket is so designed that it can be put through a very small hole in the sheathing. A chain connecting the other end of the hook with the angular bar, exerts such a tension on the hook as to cause it to draw the bracket tightly up against the sheathing, thus eliminating side swing. The accompanying illustration shows two of these brackets supporting the weight of five men. The "Quick-Set" is sold through dealers or can be obtained direct from the manufacturer.

Door dogs that are inexpensive and easy to operate

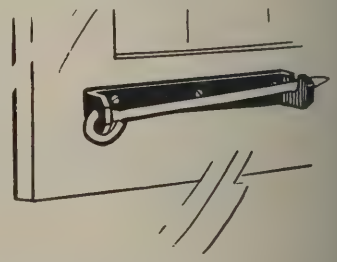
Garage Door Dogs

SCRATCHED and bent fenders, damaged car doors and broken hinges are often the result of garage doors that won't stay open when the car is being driven in or out. Various devices have been put on the market to hold garage doors open, and one



The pin grips any surface

of the simplest and least expensive of these is the door dog made by the Richards-Wilcox Mfg. Co., Aurora, Ill. This door dog consists of a pin secured to an iron rack fastened near the bottom of the door. When it is desired to stop the open door at any



The pin can be put back with foot

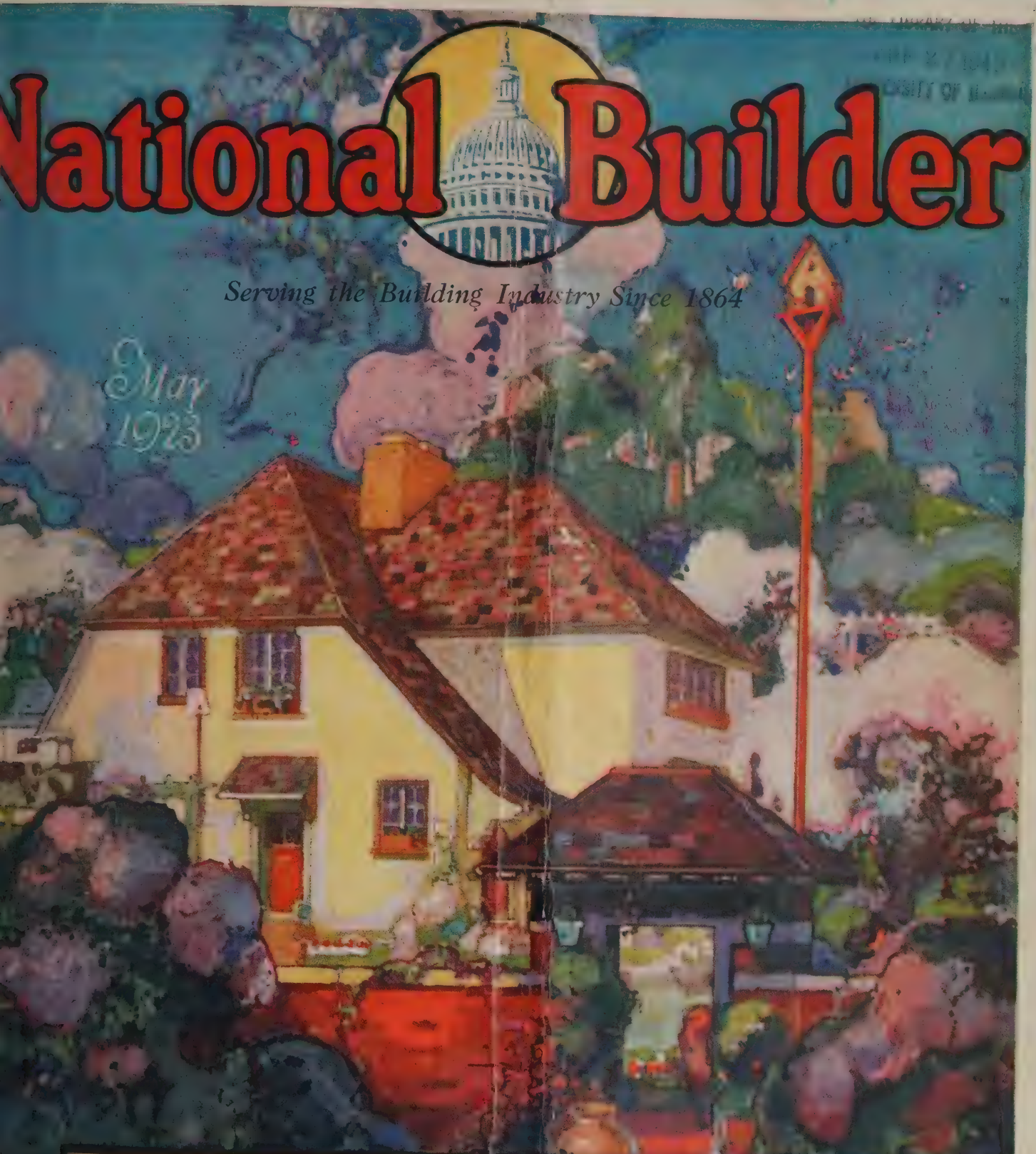
place, the pin is lifted off the rack with the foot and dropped down. It grips any kind of surface, concrete, wood or gravel. To close the door, the pin is lifted back on the rack with the foot and dropped in the slot provided. There is no stooping or any prop to adjust. A set of two door dogs retail at $1.

The City Journal Devoted Exclusively to the Contractor-Architect and Builder

National Builder

Serving the Building Industry Since 1864

May 1923



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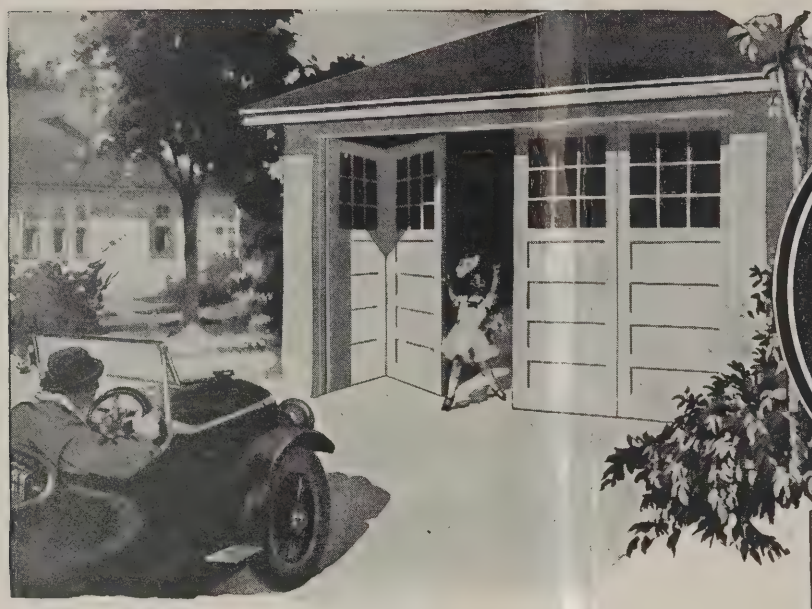
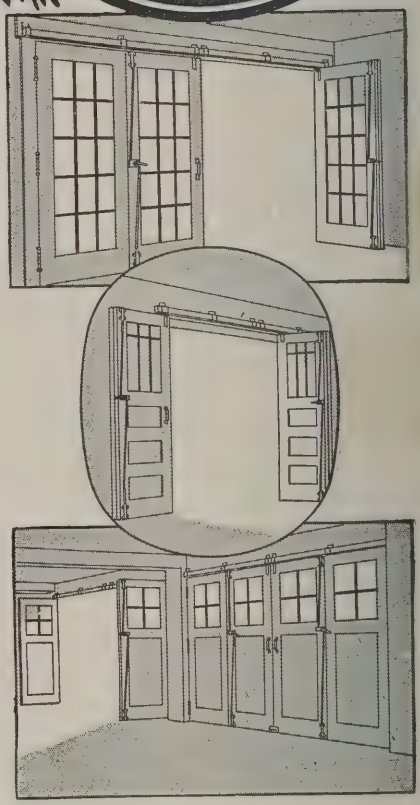


There is Only One *Slidetite*



Because they're used most, doors are *the important part* of a garage—

so equip them with the one hardware which guarantees a lifetime of service. Other builders will tell you that, for ease of operation and absolute freedom from trouble, there is only one—

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Richards-Wilcox Mfg. Co.

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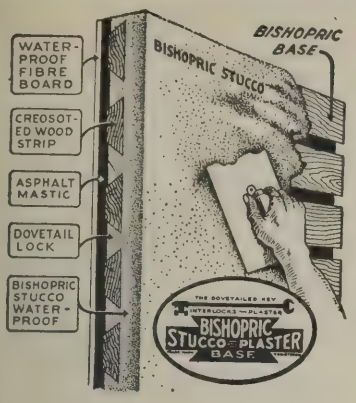

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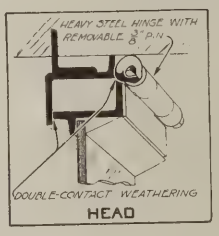
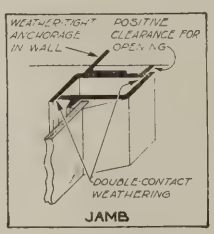
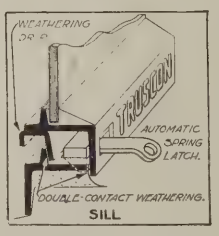
This Window Made the Basement Popular







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Volume 66 CHICAGO, MAY, 1923 Number 5

California "Mission" School House

Fremont School, San Luis Obispo, an Interesting Example of the Modern Use of Stucco Construction

THE designers of the Fremont School, at San Luis Obispo, Calif., instead of designing the school for utilitarian purposes only, have gone a step beyond and added actual beauty to the structure besides many unusual conveniences. They have produced a design with an exterior like a country club and with corridors like a hotel lobby, a design entirely different from the ordinary conception of a public school. Bearing in mind the influence of environment, they have attempted to make the building as attractive as possible rather than as plain as convenient.

Vista from veranda of school

A great aid to the general air of attractiveness is the natural beauty of the site, which is located on a slight slope to the southwest. The proper design in this case was to follow the outline of the slope as far as was practicable; consequently the design was low to the ground. The city, being the site of the mission of San Luis Obispo de Toloso, founded in A. D. 1772, both tradition and locations seemed to demand a mission style of building, which has been faithfully reproduced with such additions and modernizations as the present-day needs demanded. The exterior, which is severely plain, is relieved by the long arcades with their arched openings, the sparing use of terra-cotta ornamentation in the two principal entrances, and the twisted columns of the double arches in the arcades and attic vent. Iron and wood grilles are used in positions where need of their protection seems apparent and the iron balconies at the ends of the two-story arcade serve to accentuate the mission feeling.

The exterior is of plastered cement with a rough-dashed finish of light grey, Spanish tile of shades varying from light red to dark brown cover the roof and the polychrome tints of the terra-cotta ornaments,

Arcaded passageways connecting rooms

Fremont School, San Luis Obispo, Calif.; Orville A. Clark, Bakersfield, Calif., Architect

Playground and court in rear

Side elevation showing basement rooms

End elevation of right wing

Entrance detail in polychrome terra cotta

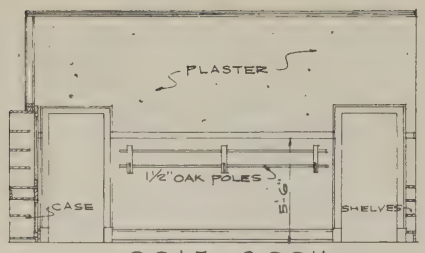
Detail of end elevation with basement entrance

End elevation of left wing

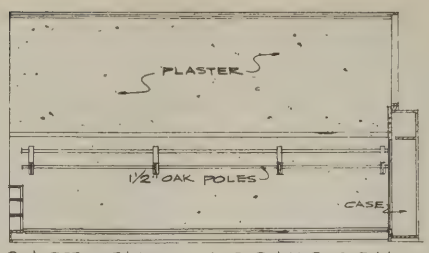
Main center corridor

Boys' toilet and urinal

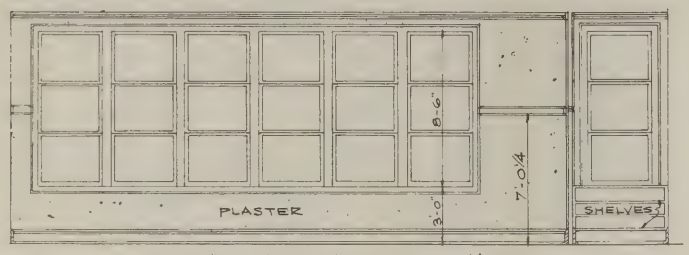
Typical class room, San Luis Obispo school



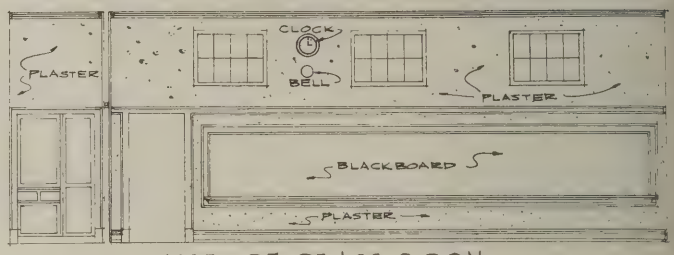
COAT ROOM
LOOKING TOWARD CLASS ROOM



BACK WALL OF COAT ROOM

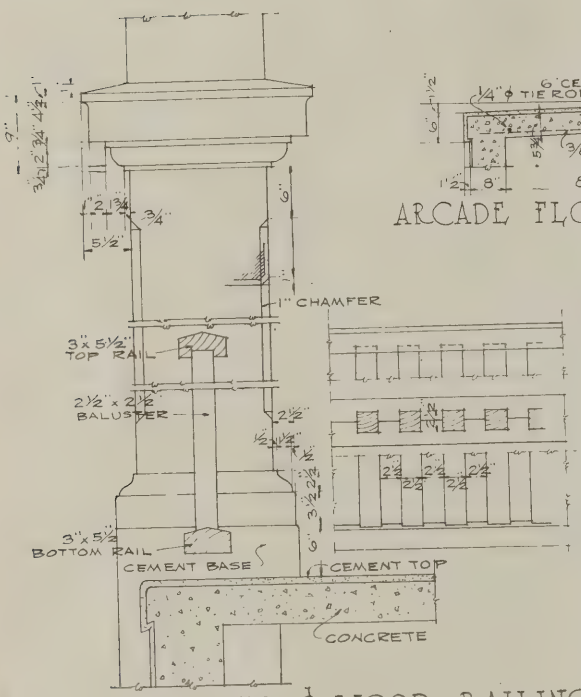


SIDE OF CLASS ROOM
LOOKING TOWARD EXTERIOR

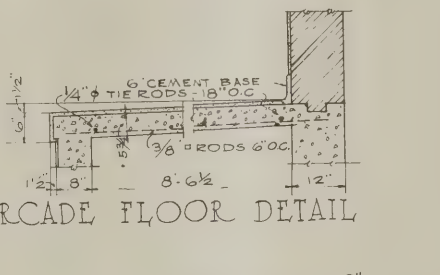


SIDE OF CLASS ROOM
LOOKING TOWARD CORRIDOR

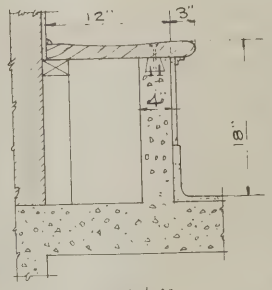
Interior details of Fremont School, San Luis Obispo, Calif. Orville L. Clark, architect



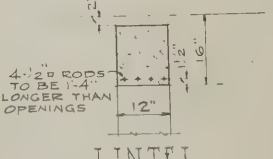
ARCADE PIER & WOOD RAILING



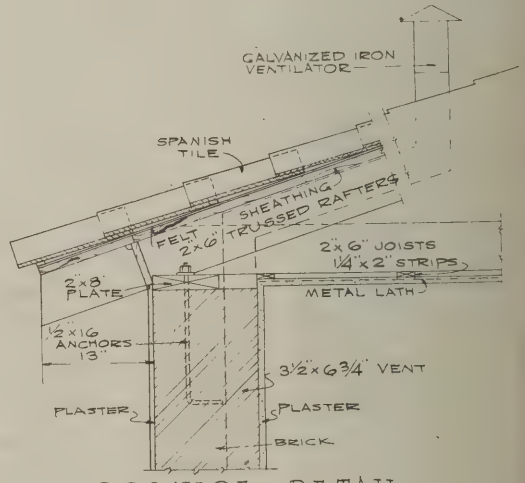
ARCADE FLOOR DETAIL



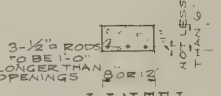
SEAT



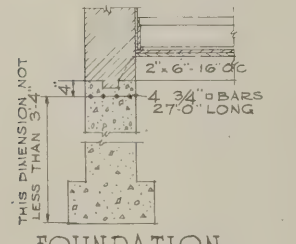
LINTEL
OVER INTERIOR OPENINGS IN FOUNDATION WALLS.



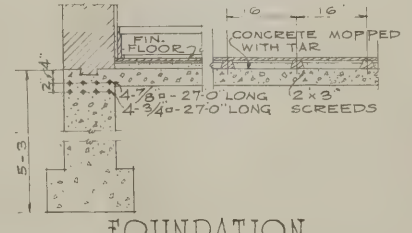
CORNICE DETAIL



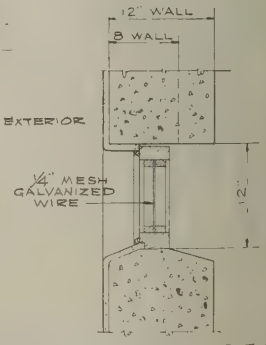
LINTEL
OVER OPENINGS IN EXTERIOR FOUNDATION WALLS



FOUNDATION WALL SECTION
UNDER 23'-10" OPENINGS IN FIRST FLOOR CLASS ROOMS

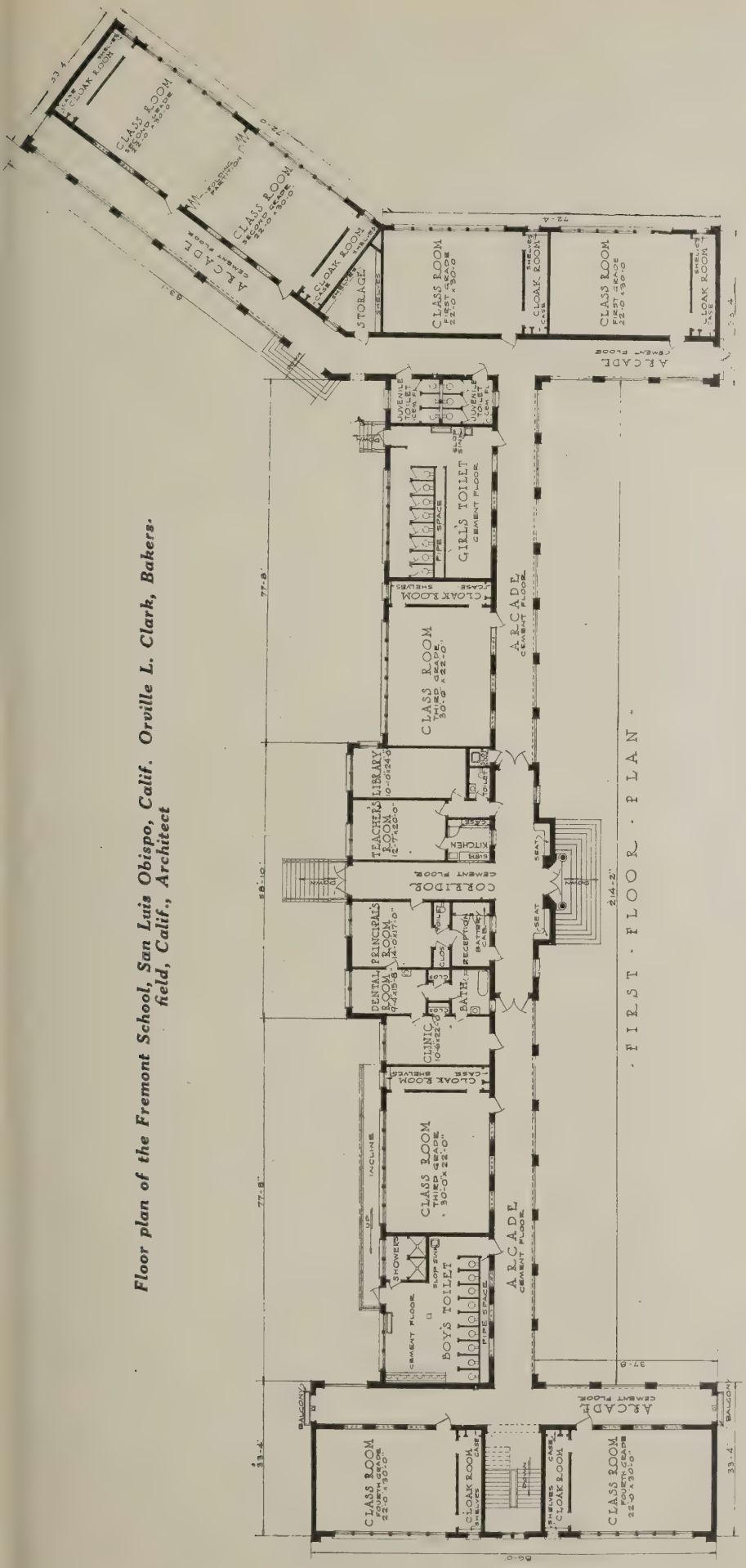


FOUNDATION WALL SECTION
UNDER 23'-10" OPENINGS IN BASEMENT CLASS ROOMS



DET. OF SCREEN VENT

Structural details of the Fremont School, San Luis Obispo, Calif. Orvile L. Clark, architect



Floor plan of the Fremont School, San Luis Obispo, Calif. Orville L. Clark, Bakersfield, Calif., Architect

together with the arcade railings of greenish blue and the exterior woodwork of light blue, supply the little touch of color needed. The beams of the arcades are of a darker tinge of blue and the interior finish and walls are of restful tints of grey.

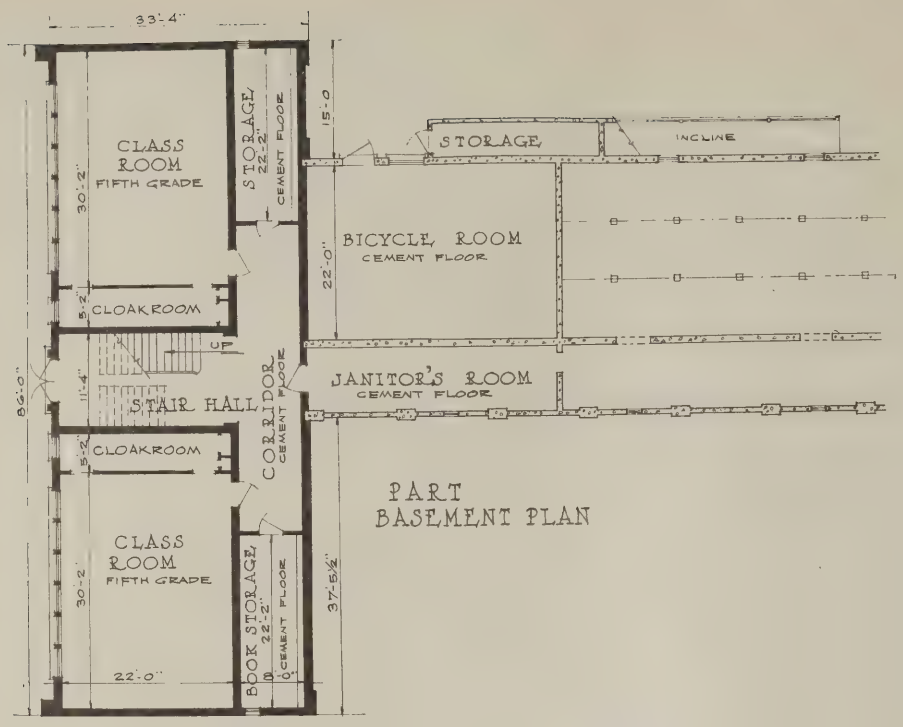
The construction details are fully as interesting as the achitecture. The intention was to make the building only one-story high, but inasmuch as it was built on a slope, the lower part of the site was excavated slightly, thus providing two class-rooms, a bicycle room and a janitor's room in the lower level.

The foundations are of concrete, the walls of brick and the upper level over the bicycle room is carried on reinforced-concrete beams. Access to the upper level in the rear is by means of an inclined walk protected with a metal hand-rail. An interesting detail is the arcade which runs the entire length of the building. The arcade floor is a reinforced-concrete slab, supported from the foundation walls and marked in squares on the surface. Rough hewn beams support the ship-lap ceiling.

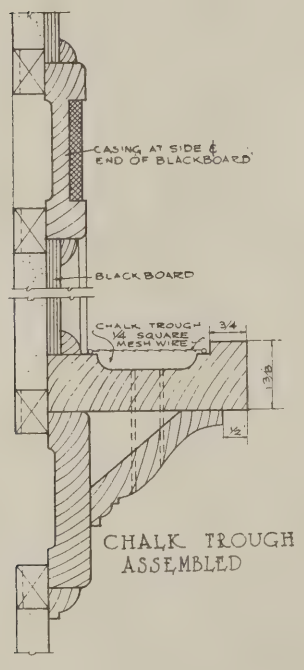
Each class-room is 22 ft. x 30 ft. and is designed for a maximum of 35 pupils. The "one-room deep" construction permits all class-rooms to have one wall entirely to the outside and one wall protected by the continuous arcaded passageways. Natural slate blackboards, finely polished, are installed in all class-rooms and the heights of these boards above the floor for the different grades have been very carefully worked out. Running entirely around the room, at door-head height, is a band of trim with an inserted strip of cork to provide tacking space for pictures and drawings, thus doing away with unsightly tack holes in plaster and trim. Great care has been used in the design of the chalk troughs, which are made with hinged screens so that all chalk and erasers lie on the screen and allow the dust to drop in the trough below. Small brass tubes placed vertically in the trough serve as a means of disposing of the dust.

In order that adequate light and ventilation may be provided, approximately 180 sq. ft. of window area has been allotted to each room. The window space is built up of "Universal" type sash which permits one-third, two-thirds or the entire window area to be thrown open at will. Three windows in each class-room opening on the arcade side are simply large transoms, 4 ft. wide and 3 ft. high, operated on pivots and intended exclusively for ventilation.

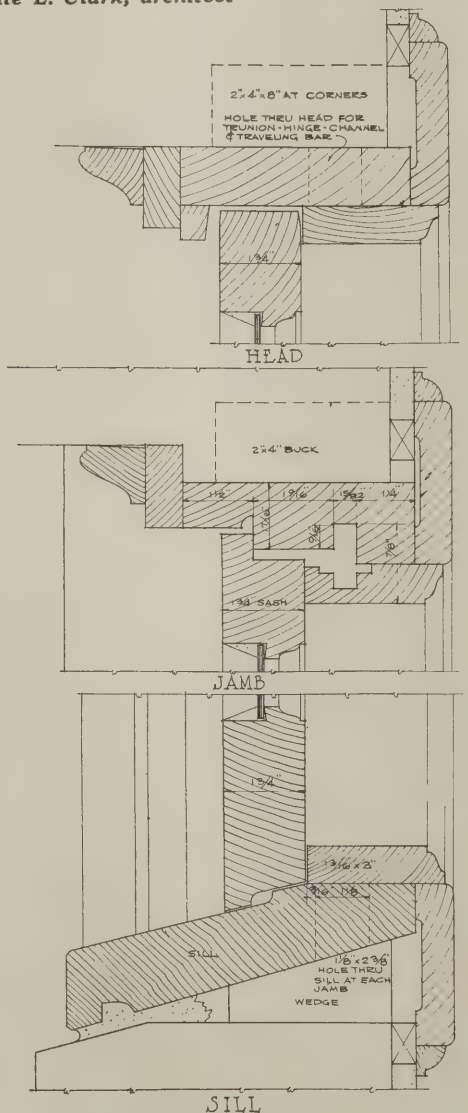
This region is not subject to severe winter weather and for this reason Clow "Gas-steam" radiators were installed in each room. This plan makes every room an independent unit in itself, dispensing with a central heating plant and reducing the attention of a janitor to the minimum. This installation received a good tryout in cold weather, and according to the architect, the results were very satisfactory. The plumb-



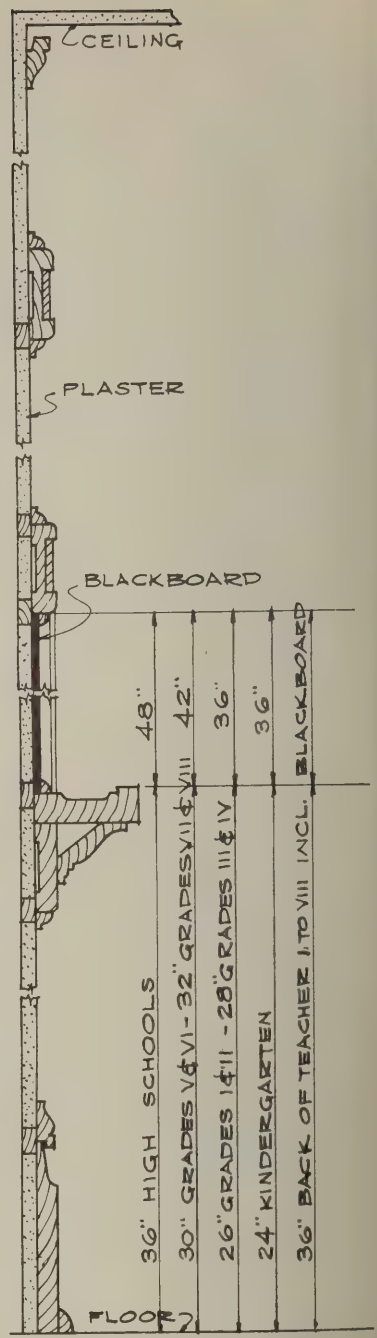
Basement floor plan and part of foundation plan, Fremont School, San Luis Obispo, Calif. Orville L. Clark, architect



Chalk trough and blackboard detail



Window detail



CLASS ROOM TRIM

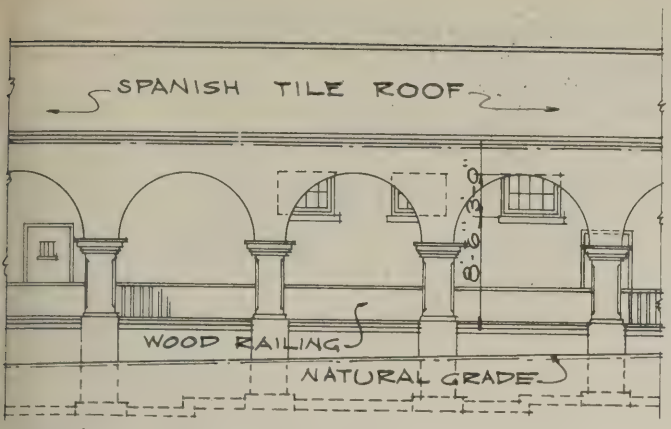
Wall trim and blackboard detail

ing fixtures are of the latest type and all supplies, wastes, vents, etc., are located above the floor line in a "utility corridor" in order that they may be readily accessible for cleaning or repairs. A feature of the building is the dental and medical clinics, fully fitted out for anything that might require attention from either, in addition to a completely equipped bathroom and two showers in the boys' toilet.

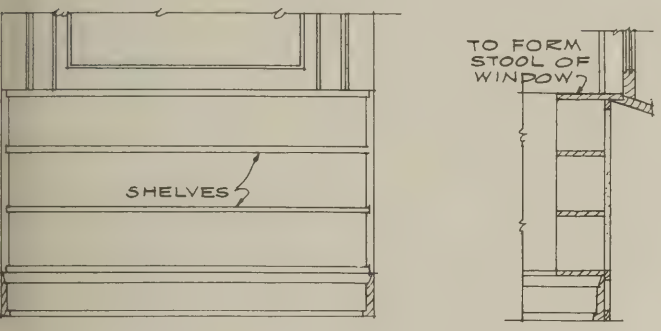
Although no assembly hall is provided, the two rooms in the northwest wing are connected by accordion doors, which allow both rooms to be thrown open together and thus furnish a floor area of 22x60 ft. The intention is to add an assembly hall at some future date to the central portion of the building in the rear of the extension which contains the executive rooms.

In the rear of the building, an extensive parcel of ground furnishes adequate recreation space. On account of its sloping nature, it has been graded in two terraces, of which the upper has been covered with finely crushed stone and is to be used for the installation of various pieces of mechanical recreation equipment.

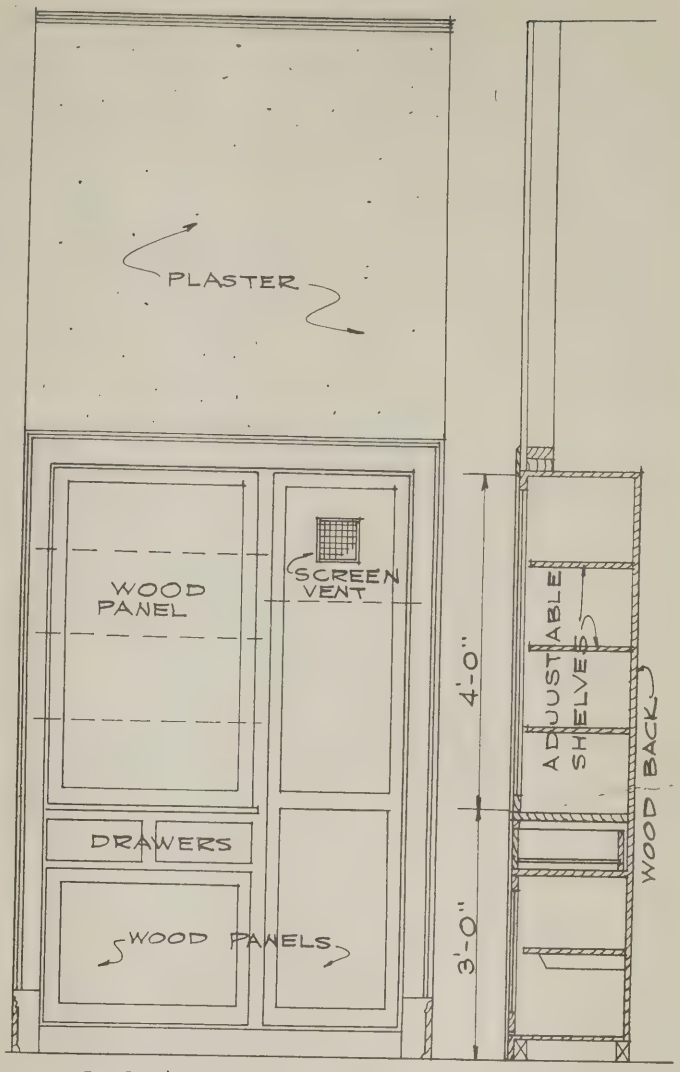
Proper landscaping has been provided in the form of several hundred trees and



PART FRONT ELEVATION



LUNCH BOX SHELVES



COAT ROOM CASE

Arcade detail and detail of interior cabinet work

Interior details of Fremont School

hrubs, planted singly or en masse as the etting required. This planting will soon emove the feeling of newness which would therwise be apparent for a long time.

Orville L. Clark of Bakersfield, Calif., as the architect for the building, and the onstruction was personally superintended y Wm. C. Mead of the architect's office.

Method of Tying a Brick Wall to a Concrete Foundation

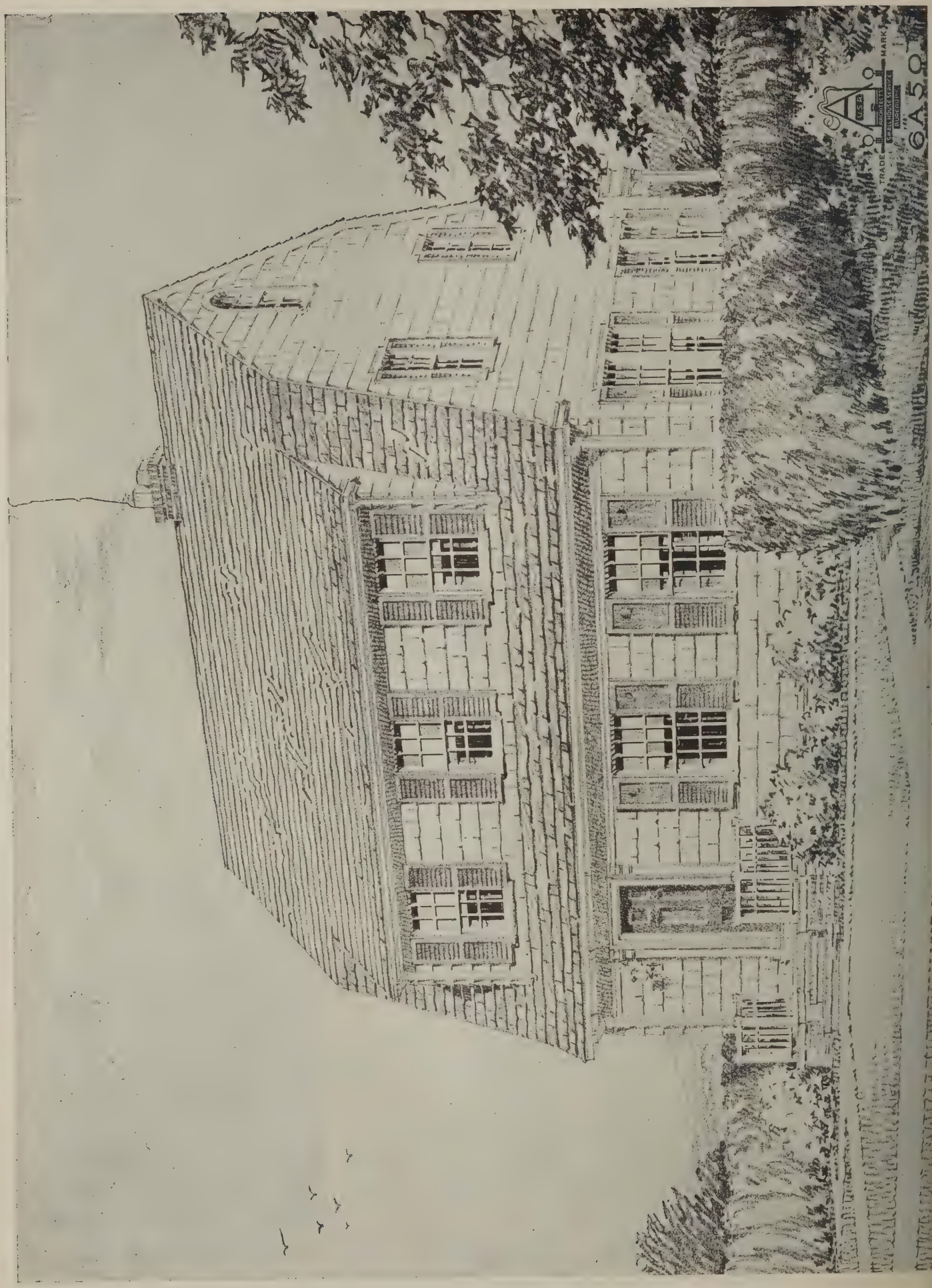
Remodeling jobs are good tests of a conruction man's ability. They afford any mber of opportunities for the exercise of inventive mind and the man who can velop new "kinks" or who knows when apply those which are suggested to him, in a fair way to make a success as a modeling specialist.

The photograph accompanying this article s taken by a NATIONAL BUILDER repreitative on a remodeling job done by the C. Morriss Const. Co., at Montgomery, a. The architect's plans called for a brick ll across the width of the lot, which ant that some method of tying the brick ll to the concrete foundation had to be devised. Because of certain work in progress it was inconvenient to build the brick wall first and then bond it in the concrete so the foundation was poured and the device shown in the photograph was used to tie the two walls together.

The ties are nothing more or less than iron bars, 1½ in. wide and ⅛ in. thick. They are bent at right angles at one end and punched at the other to allow the admission of large spikes. When the concrete is poured they are placed in the wall so that the spikes fall in the vertical brick joints and the bars in the horizontal brick joints, thus bonding the ties in both the brick and the concrete in two directions. These bars are very inexpensive, and they may be made in any blacksmith shop or even by a laborer on the job if a drill or a punch is available. The labor involved in placing them is hardlly worth considering.

If you have any remodeling "kinks" of your own invention, send them in; NATIONAL BUILDER will publish any that are interesting and will pay five dollars for each one printed.—(Editor.)

View showing wall ties in place in concrete foundation wall



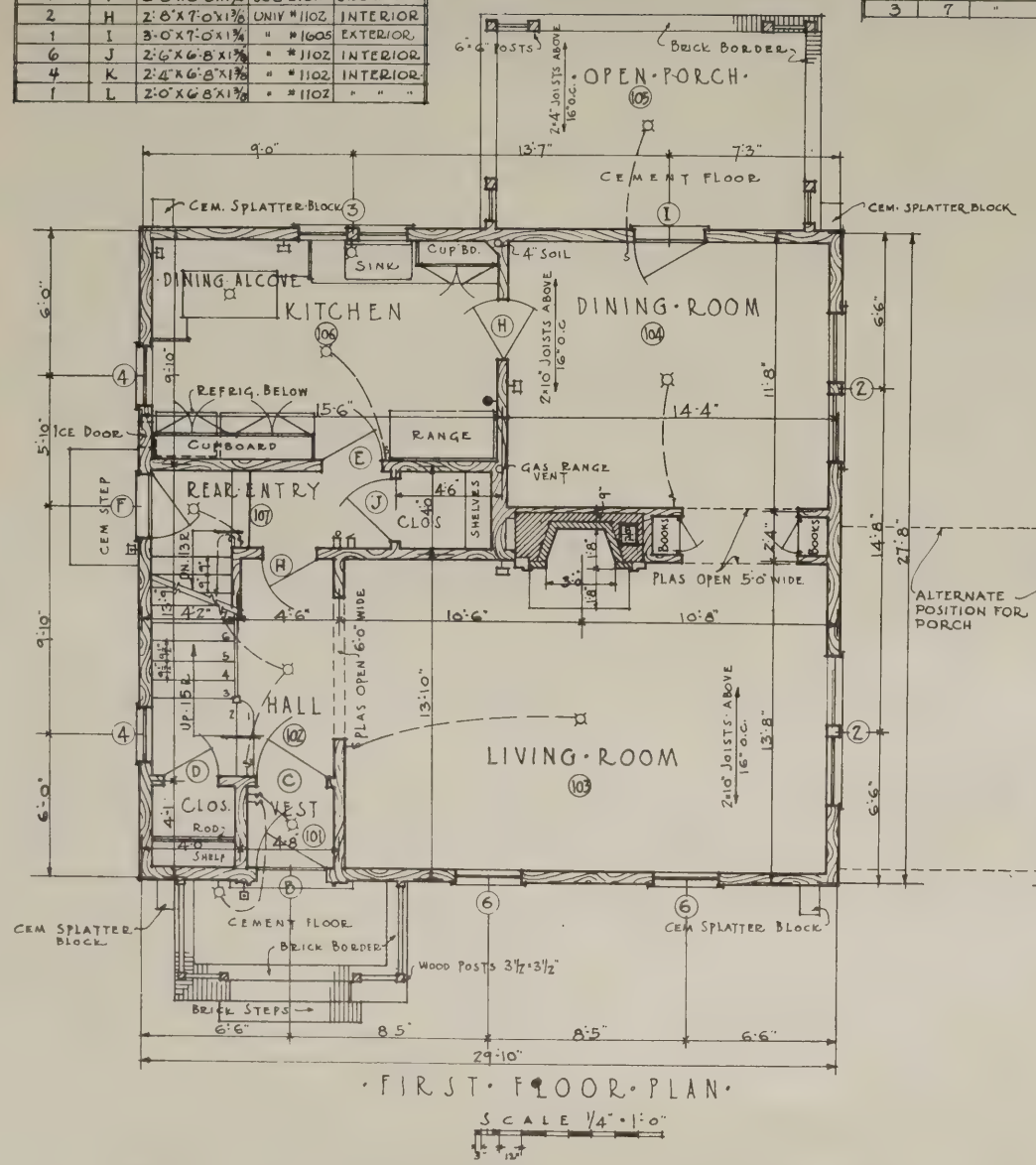
Awarded Second Prize in National Builder Competition for The Atlantic division of The Architects' Small House Service Bureau of the United States, Inc.

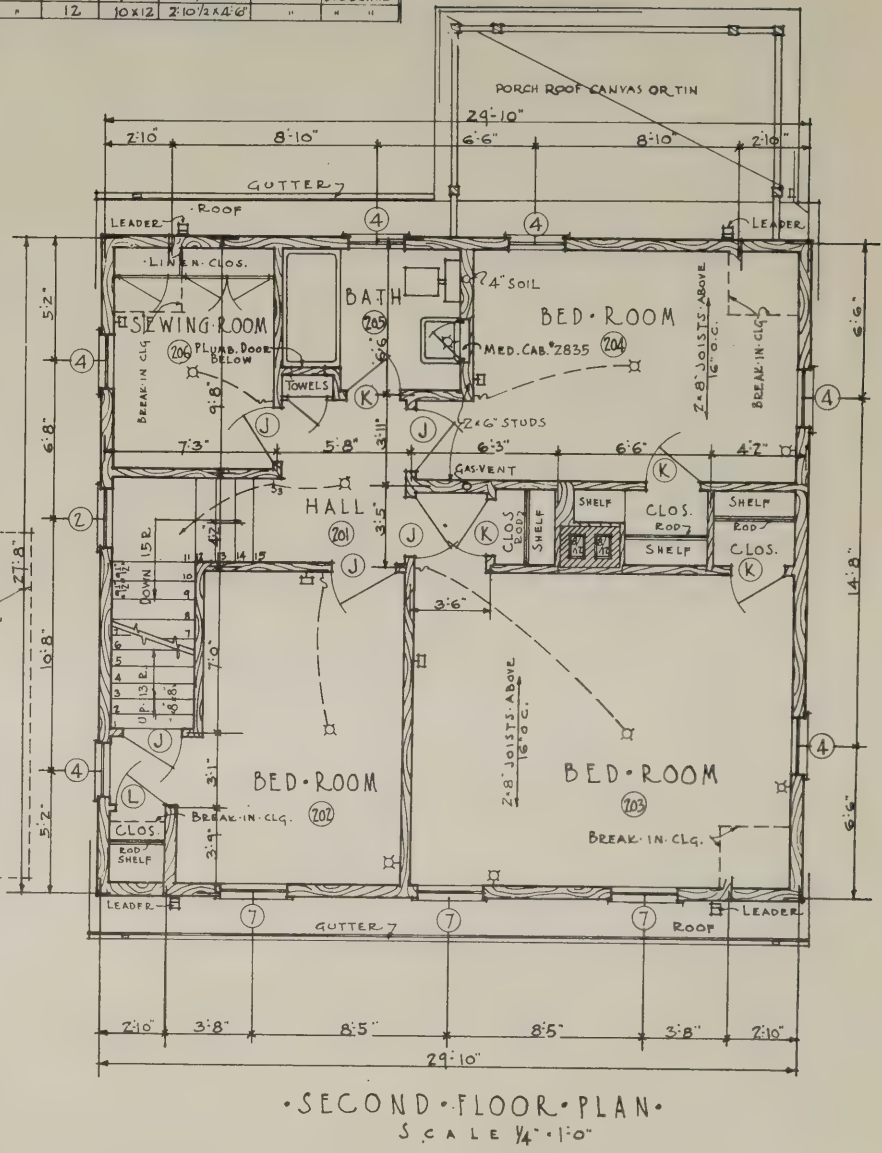
· SCHEDULE · OF · DOORS ·

QUANTITY	TYPE	SIZE	DESCRIPTION	REMARKS
1	A	2'-6" x 6'-8" x 1 3/8"	UNIV # 720	5 Panel
1	B	3'-0" x 7'-0" x 1 3/4"	SEE ELEV.	Front
1	C	3'-0" x 7'-0" x 1 3/4"	UNIV. #1605	INTERIOR
1	D	2'-4" x 7'-0" x 1 3/8"	" #1102	"
1	E	2'-8" x 6'-8" x 1 3/8"	See Elev.	"
1	F	2'-8" x 6'-8" x 1 3/4"	See Elev.	SIDE ENT.
2	H	2'-8" x 7'-0" x 1 3/8"	UNIV # 1102	INTERIOR
1	I	3'-0" x 7'-0" x 1 3/4"	" #1605	EXTERIOR
6	J	2'-6" x 6'-8" x 1 3/8"	" #1102	INTERIOR
4	K	2'-4" x 6'-8" x 1 3/8"	" #1102	INTERIOR
1	L	2'-0" x 6'-8" x 1 3/8"	" #1102	" " "

· SCHEDULE · OF · WINDOWS ·

QUANTITY	TYPE	DESCRIPTION	NO OF LIGHTS	SIZE GLASS	SIZE OF OPENG FOR SASH	THICKNESS SASH	FRAME
5	1	Basement	3	8x10	2'-4" x 1'-3"	1 3/8"	See Detail 2 IN MULLION FRAME
5	2	Double Hung	12	10x14	2'-10 1/2" x 5'-2"	"	" IN MULLION 4 FRAMES
2	3	" "	8	10x8	2'-1" x 3'-2"	"	" "
8	4	" "	12	9x12	2'-7 1/2" x 4'-6"	"	" "
2	5	" "	12	8x12	2'-4 1/2" x 4'-6	"	ROUND HEAD
2	6	" "	16	9x12	3'-4 3/4" x 4'-6	"	SEE DETAIL
3	7	" "	12	10x12	2'-10 1/2" x 4'-6"	"	" "





Floor plans of House No. 6A50, designed especially for National Builder by the Atlantic division of The Architects' Small House Service Bureau of the United States, Inc. Copyrighted by National Build er and The Architects' Small House Service Bureau

Two-Story Dutch Colonial House No. 6A50

Designed Especially for National Builder by the Atlantic Division of the Architects' Small House Service Bureau

IN order to give home-building contractors and their clients an opportunity to choose their favorite plan with the exterior that they most prefer, we have designed this new exterior for plans we have shown before. The February issue of the NATIONAL BUILDER showed No. 6A46, which is like No. 6A50 in all essential particulars. This plan has proved to be especially desirable. Home buyers are enthusiastic about the great amount of accommodation it gives and its extraordinarily fine appearance.

When you compare this plan with No. 6A46, you will note that there is an entirely different arrangement of the kitchen. The kitchen can be worked out with either exterior according to the home owner's desire.

PRIZE OFFER!

NATIONAL BUILDER subscribers have an opportunity to win prizes totaling $525 — first prize $250, second $125, and three $50 prizes. All you need to do is to tell how you have used The Architects' Small House Service Bureau plans and houses in your business. Drop a line to the editor for further details.

This house is 30 ft. wide and is planned for a 40-ft. lot with the porch at the rear. An alternate position of the porch at the side is noted on the drawings. A sleeping porch over the open porch is also provided for by the drawings if anyone should desire it.

This design calls for frame construction with a base course of cement and with the walls covered with wide siding or with shingles. It is designed for a west or south facing. Reversed plans for lots which call for other facings are furnished without extra charge.

The regular price of this plan is $30.50. (NATIONAL BUILDER subscribers $15.50.)

EXCAVATING—198 cu. yd.

BACKFILL—45 cu. yd.

FOUNDATIONS—If 12" concrete, 49 cu. yd. gravel, 198 sax cement; if 9" concrete, 40 cu. yd. gravel, 162 sax cement; if 12" tile, 23500 CBM tile, 18 cu. yd. mortar; if 9" tile, 18900 CBM tile, 14 cu. yd. mortar; 1200 face brick, 1 cu. yd. mortar.

CEMENT FLOOR—7 cu. yd. gravel; 5 cu. yd. sand; 73 sax cement; 4 cement spatter blocks.

CHIMNEY — 2840 common brick; 120 face brick; 100 fire brick; 20 sq. ft. hearth tile; 180 inside face brick; 60 lin. ft. 8x12 flue tile; 20 lb. fire clay; 3 cu. yd. mortar; 1 cast-iron ash dump; 1 throat and damper; 1 angle 4x3x¼-4'0; 2—8x10 cleanout doors; 3—6" adjustable thimbles; 6 yd. metal lath.

LATH—12290 lath; 9 yd. metal over boiler.

PLASTER—9 sq. yd. plaster on metal lath; 885 sq. yd. plaster on wood lath; 24 sq. yd. stucco on cement walls; 14 sq. yd. Keene's cement.

TILE FLOORS—42 sq. ft. ceramic tile; 24 lin. ft. cove base.

LUMBER—4—6x6-7 posts; 3—2x10-12 girder; 3—2x10-8 girder; 2—2x4-12 girder ribbon; 2—2x 4-8 girder ribbon; 8 ft. plank cleanout cover; 60 lin. ft. 2x4 basement partition plates; 11—2x4-8 basement partition studs; 200 ft. D & M basement partition sheathing; 4—2x6-14 basement stair stringers; 48—2x10-14 first-floor joist; 60 lin. ft. 2x10 box sill; 4—2x10-14 doubles; 3—2x10-16 headers; 300 lin. ft. 1x4 bridging; 1100 lin. ft. grounds; 973 ft. com. bds. first-floor subfloor; 1174 ft. 13/16x1½ first-floor finish floor; 426 lin. ft. 2x4 first-floor partition plates; 130—2x4-9 first-floor partition studs; 2—2x10-16 opening headers; 48—2x10-14 second-floor joist; 4—2x10-14 second-floor joist doubles; 4—2x10-16 headers; 60 lin. ft. 1x4 ribbon; 900 ft. com. bds. second-floor subfloor; 1174 ft. 13/16x1½ second-floor finish floor; 4—2x6-18 stair horses; 363 lin. ft. 2x4 second-floor partition plates; 110—2x4-8 second-floor partition studs; 48—2x8-14 second-floor ceiling joist; 4—2x8-12 headers; 980 ft. 4" D & M attic floor; 2—2x6-10 porch girders; 4—2x6-4 porch girders; 4—2x4-10 porch ceiling joist; 4—2x8-9 porch girders; 2—2x8-14 porch girders; 12—2x4-9 porch ceiling joist; 12—2x6-10 porch deck joist; 10—2x4-6 porch rafters; 336 lin. ft. 2x4 outside wall plates; 96—2x4-10 outside wall studs; 48—2x4-12 lower gable studs; 8—2x4-16 upper gable studs; 144 lin. ft. 2x4 dormer plates; 24—2x4-12 dormer studs; 4—2x4-14 attic stair horses; 24—2x4-6 collar ties; 25—2x4-16 lookouts; 38—2x4-18 rafters; 38—2x4-4 rafters; 12—2x4-14 rafters; 14—2x4-14 rafters; 2100 ft. bds. roof sheathing; 2 squares canvas deck; 14 M shingles; 2300 ft. shiplap wall sheathing; 2400 ft. siding; 165 ft. ceiling porch; 200 ft. ceiling plancier; 25—2x4-16 scaffold and extras; 8—2x6-14 scaffold and extras; 4—2x8-20 scaffold and extras; 3—2x10-16 scaffold and extras; 4—2x12-12 scaffold and extras.

MILLWORK—**Frames:** 3 single 8x10-3L-1⅜; 1 mul. 8x10-3L-1⅜; 2 mul. 10x14-12L-1⅜; 1 single 10x14-12L-1⅜; 1 mul. 10x8-8L-1⅜; 8 single 9x12-12L-1⅜; 2 single 8x12-12L-1⅜ (segment top); 2 single 9x12-16L-1⅜; 3 single 10x12-12L-1⅜. **Windows:** 5 cellar sash 8x10-3L-1⅜; 5 windows 10x14-12L-1⅜; 2 10x8-8L-1⅜; 8—9x12-12L-1⅜; 2—8x12-12L-1⅜ (segment top); 2 9x12-16L-1⅜; 3 10x12-12L-1⅜. **Storm Sash:** 5—8x10-3L-1⅛; 5—10x14-12L-1⅛; 2—10x8-8L-1⅛; 8—9x12-12L-1⅛; 2—8x12-12L-1⅛ (segment top); 2—9x 12-16L-1⅛; 3—10x12-12L-1⅛. **Screens:** 5—8x10-3L-1⅛; 5—10x14-12L-1⅛; 2—10x8-8L-1⅛; 8—9x12-12L-1⅛; 2—8x12-12L-1⅛; 2—9x12-16L-1⅛; 3—10x12-12L-1⅛. **Shutters:** 4 pr. (windows) 10x 14-12L-1⅛; 8 pr. 9x12-12L-1⅛; 2 pr. 9x12-16L-1⅛; 3 pr. 10x12-12L-1⅛. **Outside Door Frames:** 1—3'0x7'0-1¾; 1—2'8x6'8-1¾; 1—3'0x7'0-1¾; 1 icing door frame. **Outside Doors:** 1 dr. 3'0x7'0-1¾; 1 dr. 2'8x6'8-1¾; 1 dr. 3'0x7'0-1¾ (No. 1605); 1 icing door. **Storm Doors:** 1—3'0x7'0-1⅛; 1—2'8x6'8-1⅛; 1—3'0x7'0-1⅛. **Screen Doors:** 1 — 3'0x7'0-1⅛; 1 — 2'8x6'8-1⅛; 1 — 3'0x7'0-1⅛. **Outside Millwork:** 260 lin. ft. cornice; 1 special front entrance trim; 6 porch posts; 4 lattice frames 1'6x7'0; 13 lin. ft. front porch rail; 33 lin. ft. deck rail; 60 lin. ft. facia; 46 lin. ft. ceiling cove; 32 lin. ft. porch facia and soffit; 6 deck newels. **Interior Doors:** 1—2'6x6'8-1⅜ (No. 720); 1—3'0x7'0-1¾ (1605); 1—2'4x7'0—1⅜ (1102); 1—2'8x6'8-1⅜; 1—2'8x7'0-1⅜ (1102); 6—2'6x6'8-1⅜ (1102); 5 — 2'4x6'8-1⅜ (1102); 1 — 2'0x6'8-1⅜ (1102). **Jambs:** 1—2'6x6'8; 1—3'0x7'0; 1—2'4x 7'0; 1—2'8x6'8; 1—2'8x7'0; 6—2'6x6'8; 5—2'4x 6'8; 1—2'0x6'8. **Interior Trim:** 3 sides single 8x10-3L; 1 side mul. 8x10-3L; 2 sides mul. 10x 14-12L; 1 side single 10x14-12L; 1 side mul. 10x 8-8L; 8 sides single 9x12-12L; 2 sides single 8x 12-12L; 2 sides single 9x12-16L; 3 sides single 10x12-12L; 1 side dr. 3'0x7'0; 1 side dr. 2'8x6'8; 1 side dr. 3'0x7'0; 1 side icing door; 2 side dr. 2'6x6'8; 2 side dr. 3'0x7'0; 2 side dr. 2'4x7'0; 2 side dr. 2'8x6'8; 2 side dr. 2'8x7'0; 12 side dr. 2'6x6'8; 10 side dr. 2'4x6'8; 2 side dr. 2'0x6'8; 1 flight basement stairs; 1 flight grade stairs; 1 flight main stairs; 1 flight attic stairs; 1 medicine cabinet No. 2835; 1 towel cabinet; 1—7'0 linen closet; 1 utility door; 2 bookcases; 1 mantel shelf; 1—3'6 kitchen cupboard; 1 corner seat; 1 alcove table; 1—7'0 kitchen cabinet; 26 lin. ft. closet shelving; 26 lin. ft. closet hook strip; 24 lin. ft. closet clothes rod; 288 lin. ft. picture molding; 124 lin. ft. ceiling cove; 700 lin. ft. base; 700 lin. ft. base shoe; 700 lin. ft. base molding; 10 lin. ft. threshold. **Note:** If vestibule, living and dining room trim is changed, it will affect the following trim: 1 door 3'0x7'0—1¾; 1 side trim 3'0x7'0; 1 door 3'0x7'0-1¾ (1605); 1 jamb 3'0x 7'0; 2 side trim 3'0x7'0; 2 doors 2'4x7'0-1⅜ (1102); 1 jamb 2'4x7'0; 2 sides trim 2'4x7'0; 1 door 2'8x7'0-1⅜ (1102); 1 jamb 2'8x7'0; 1 side trim 2'8x7'0; 1 main stairs with rail; 1 door 3'0x7'0-1¾ (1605); 1 side trim 3'0x7'0; 2 sides mul. trim 10x14-12L; 2 sides single trim 9x12-16L; 2 bookcases; 1 mantel shelf; 124 lin. ft. ceiling cove; 124 lin. ft. picture molding; 124 lin. ft. base; 124 lin. ft. base shoe; 124 lin. ft. base molding; 800 ft. 13/16x1½ finish flooring.

TINWORK—30 lin. ft. ridge roll; 2 finials; 12 lin. ft. chimney flashing; 130 lin. ft. gutter; 40 gutter hangers; 8 nipples; 8 elbows; 8 offsets; 4 shutoffs; 8 strainers; 10 gutter ends; 2 miters; 68 lin. ft. conductor; 16 conductor hooks; 100 lin. ft. flashing; 350 tin shingles.

HARDWARE—5 cellar sash sets; 22 sash locks; 22 sash lifts; 27 storm sash set; 27 screen sash sets; 17 sets shutter hardware for pairs; 1 front door set with butts; 1 rear door set with butts; 1 side door set with butts; 1 icing door set with butts; 3 storm door sets; 3 screen door sets; 1 floor hinge; 2 push plates; 16 inside door sets with butts; 20 door bumpers; 4 doz. clothes hooks; 1200 lb. assorted nails; 7 lb. assorted brads; 1 coal chute; 550 lb. sash weights; 5 hanks sash cord; 4 stair rail brackets; (medicine cabinet: 1 pr. ornamental butts, 1 cupboard turn); (1 towel cabinet: 1 cupboard turn, 1 pr. ornamental butts); (linen closet: 3 pr. ornamental butts, 2 cupboard turns, 1 blind catch); 4 friction stays, utility door; (bookcase: 2 pr. ornamental butts, 2 cupboard turns); (kitchen cabinet: 10 pr. ornamental butts, 5 cupboard turns, 5 elbow catches); (kitchen cabinet: 1 set castors, 1 bin pull, 8 drawer pulls, 4 pr. ornamental butts, 2 cupboard turns, 2 elbow catches).

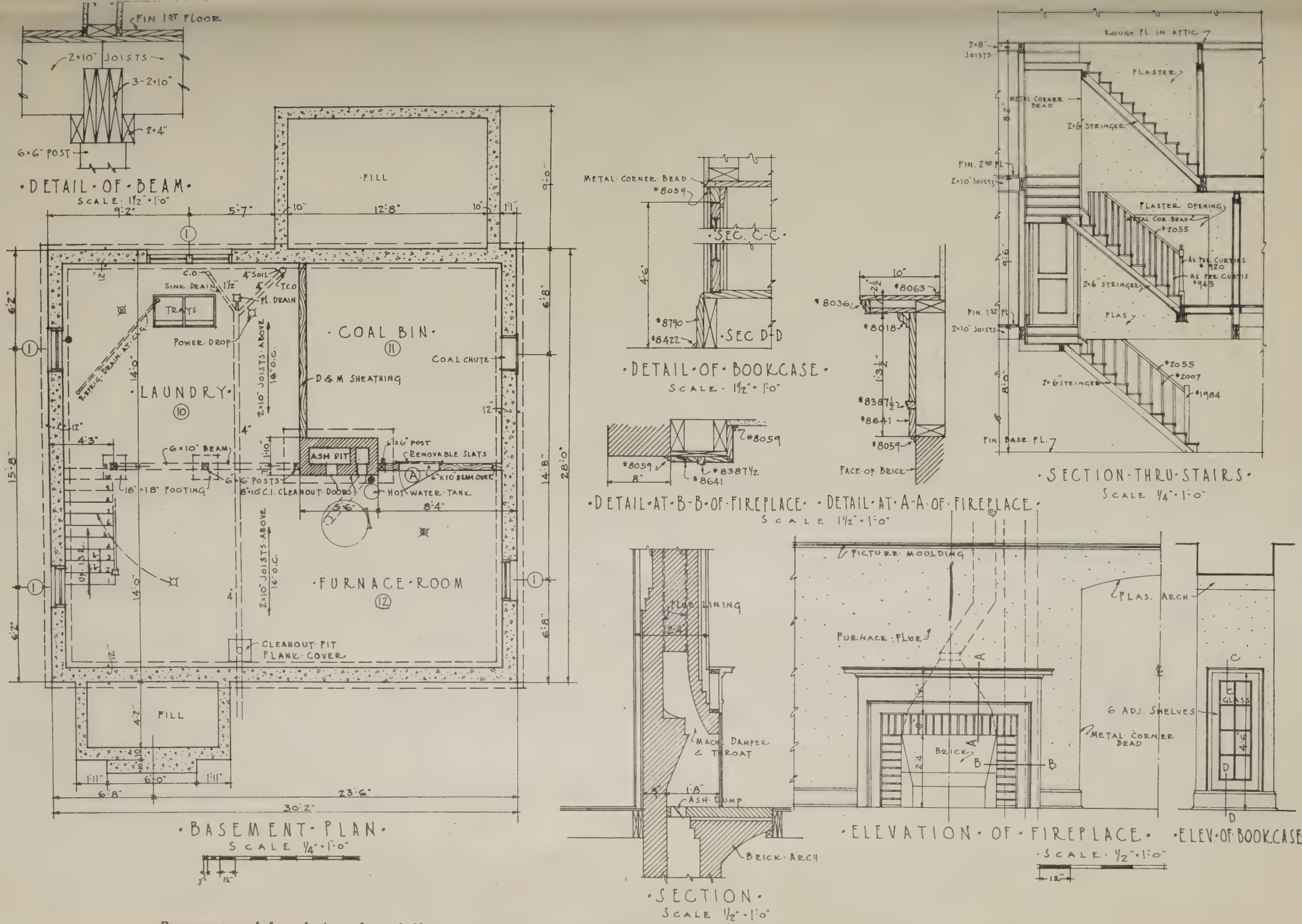
WEATHER STRIPPING—5 cellar sash 8x10-3L; 5 windows 10x14-12L; 2—10x8-8L; 8—9x12-12L; 2—8x12-12L; 2—9x12-16L; 3—10x12-12L; 2 door 3'0x7'0; 1 door 2'8x6'8.

CAULKING—3 door frames; 1 icing door frame; 1 coal chute; 19 single frames; 4 mullion frames.

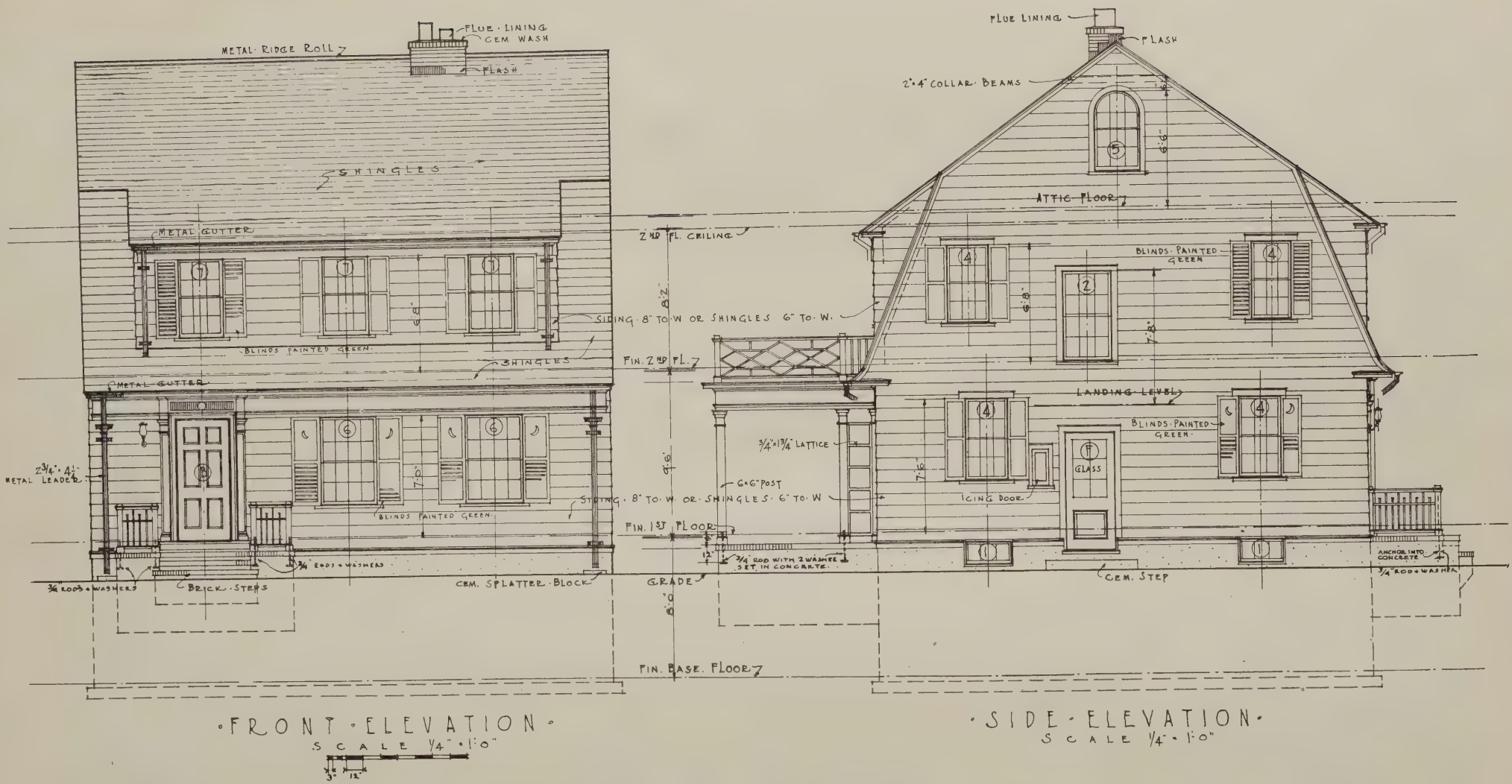
INSULATION—4 rolls felt floors; 4 rolls felt roof; 5 rolls felt walls; 1960 ft. flaxlinum or equal outside walls; 800 ft. ½-in. flaxlinum or equal second-floor ceiling.

EXTERIOR PAINTING—15 gal. body paint; 6 gal. trim paint; 3 gal. boiled oil; 42 gal. shingle stain; 1 gal. screen paint; 1 gal. sash paint; ¼ gal. shutter paint; ½ gal. shellac; 1 gal. japan; 15 lb. putty; 6 doz. sheets sandpaper.

INTERIOR PAINTING—15 gal. white paint; 8 gal. enamel; 6 gal. filler stain; 3 gal. shellac; 15 gal. interior varnish; 4½ gal. floor shellac; 8 gal. floor varnish; 2 gal. oil; 1 gal. japan; 1 gal. turpentine; 1 gal. alcohol; 3 lb. steel wool.



Basement and foundation plan of House No. 6A50. Copyrighted by National Builder and The Architects' Small House Service Bureau



FRONT ELEVATION
SCALE ¼" = 1'-0"

SIDE ELEVATION
SCALE ¼" = 1'-0"

Front and side elevations of House No. 6A50, designed especially for National Builder by the Atlantic division of The Architects' Small House Service Bureau of the United States, Inc. Copyrighted by National Builder and The Architects' Small House Service Bureau

Dimensions are taken to outside of foundation walls, to outside of studs on exterior walls and center of studs for partitions.

Foundation walls shown concrete may be stone, brick, concrete block, or load-bearing hollow tile.

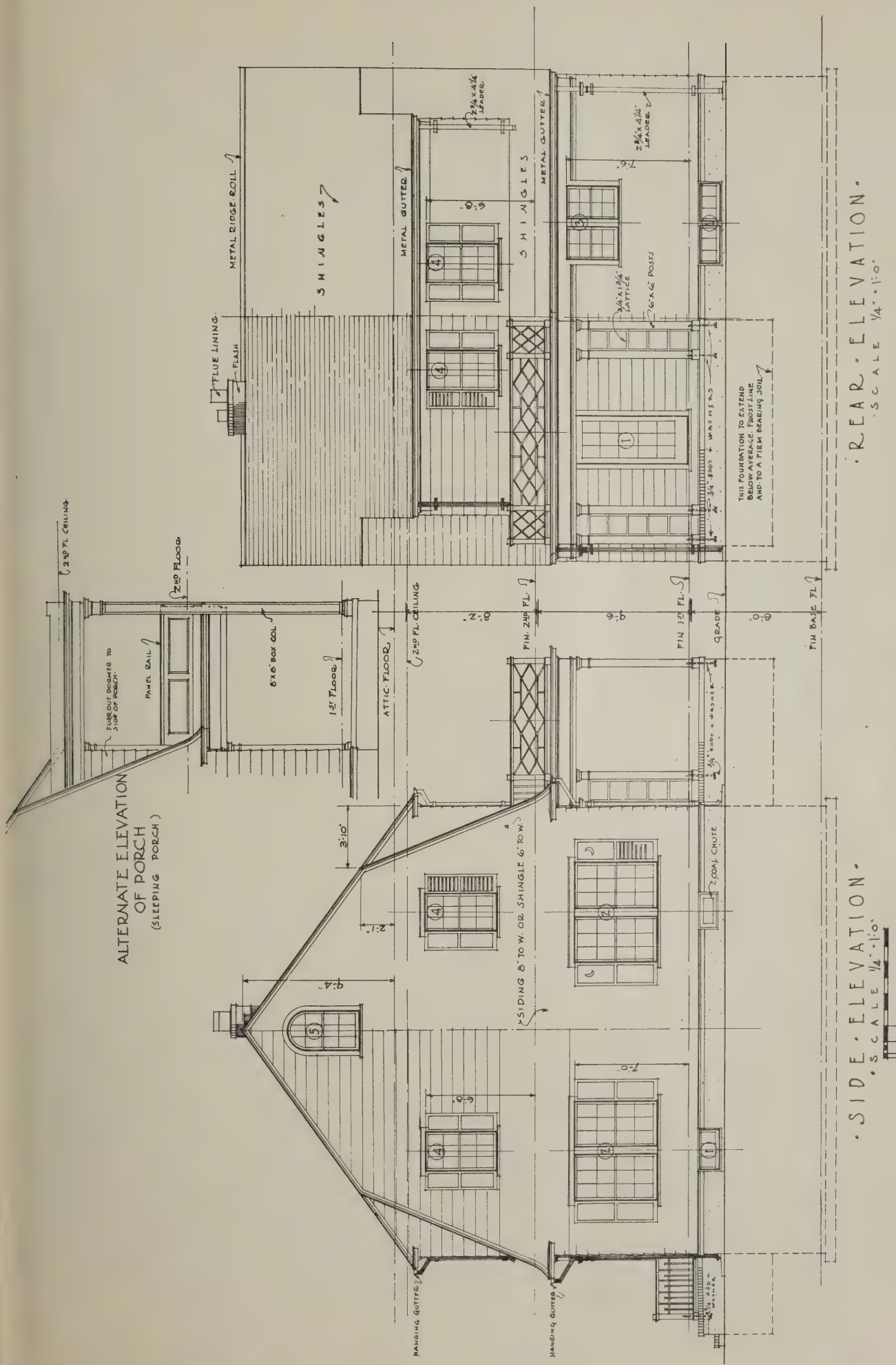
Where building ordinances permit, foundation walls may be 9 in. thick (with 20x9-in. footings) except in case of stone, which shall be 18 in. thick.

Stock numbers refer to moldings in Universal Millwork Design Book No. 20. In case these moldings cannot be procured, others of similar design and size may be substituted.

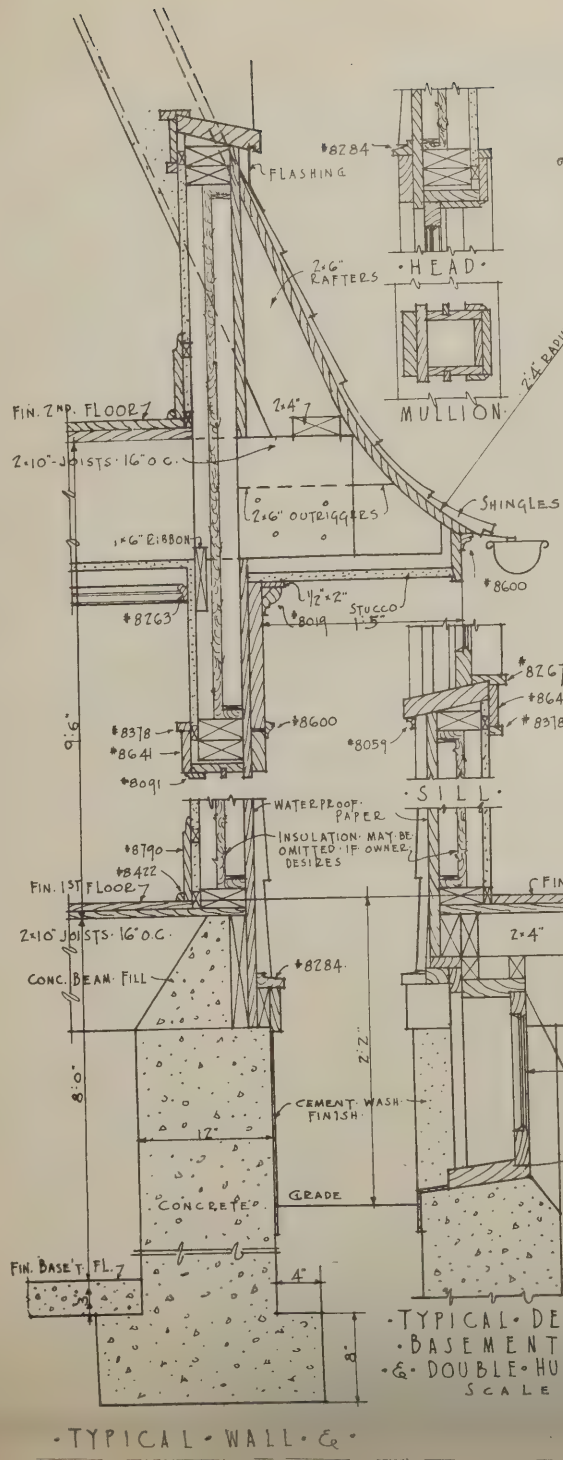
Provide 1⅛-in. screen and storm sash for all exterior openings except ice door unless otherwise noted. Bottom rail of storm sash to have vent.

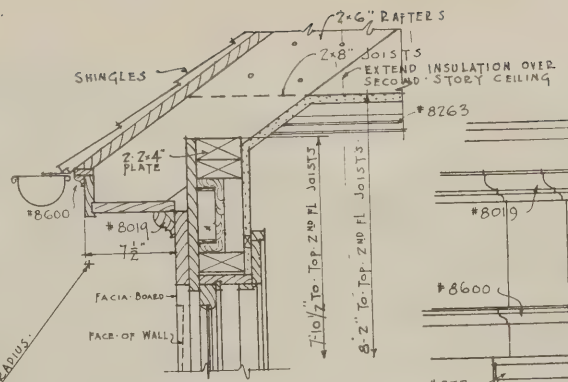
The chart below shows the symbols used on all the plans of The Architects' Small House Service Bureau of the United States, Inc.

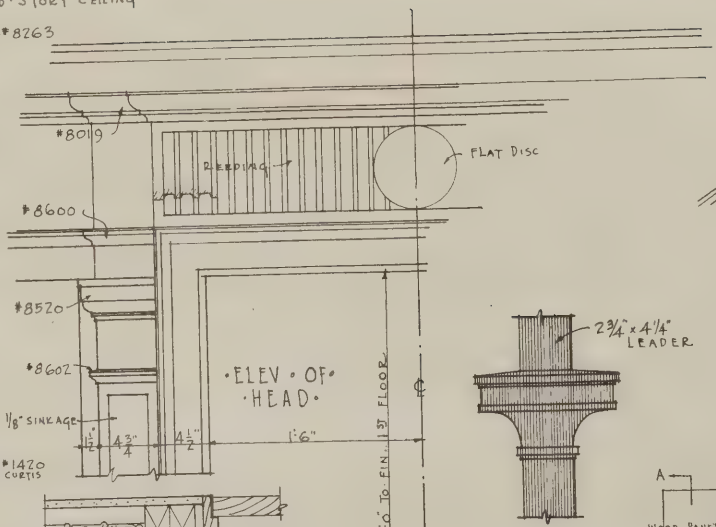
MATERIALS		ELECTRIC WIRING SYMBOLS			
CONCRETE		CEILING OUTLET		3 WAY SWITCH	
BRICK		DROP CORD		GAS OUTLET	
WOOD		BRACKET		PUSH BUTTON	
PLASTER		BASE PLUG		BELL OUTLET	
TILE		SWITCH		BUZZER	



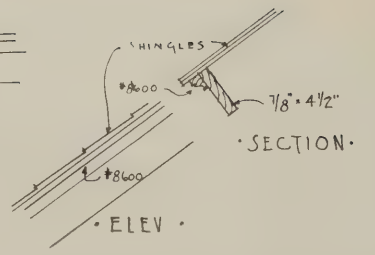
Side and rear elevations of House No. 6A50, designed especially for National Builder by the Atlantic division of The Architects' Small House Service Bureau of the United States, Inc. Copyrighted by National Builder and The Architects' Small House Service Bureau

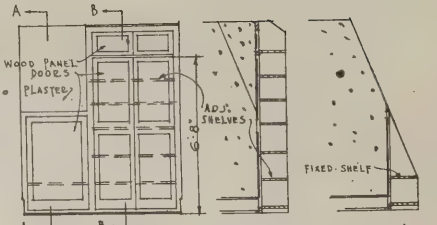

FLASHING
#8284
2×6" RAFTERS
·HEAD·
MULLION
2×4"
2×10" JOISTS 16" O.C.
2×6" OUTRIGGERS
1×6" RIBBON
SHINGLES
#8600
#8263
1½"×2" STUCCO
1'-5"
#8019
#8267
#8641
#8378
#8059
#8091
·SILL·
WATERPROOF PAPER
INSULATION MAY BE OMITTED IF OWNER DESIRES
#8790
#8422
FIN. 1ST FLOOR
2×10" JOISTS 16" O.C.
CONC. BEAM FILL
2×4"
2×10" JOISTS
1'-4"
CEMENT WASH FINISH
12"
CONCRETE
GRADE
FIN. BASE'T. FL.
4"
8'-0"
2'-2"
·TYPICAL WALL &

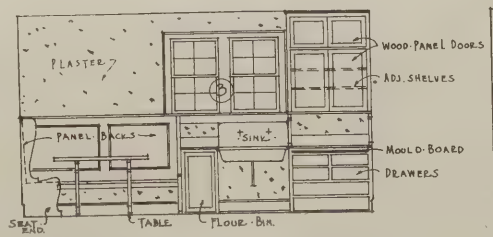

2×6" RAFTERS
2×8" JOISTS
EXTEND INSULATION OVER SECOND STORY CEILING
SHINGLES
#8263
2·2×4" PLATE
#8600
#8019
7½"
FACIA BOARD
FACE OF WALL
7'-10½" TO TOP 2ND FL JOISTS
8'-2" TO TOP 2ND FL JOISTS
·SECTION THRU
·DORMER CORNICE·
SCALE 1½"·1'-0"

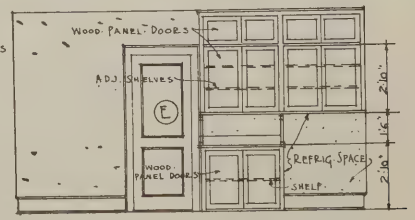

#8019
FLAT DISC
REEDING
#8600
#8520
#8602
1/8" SINKAGE
4¾"
4½"
1'-6"
7'-0" TO FIN. 1ST FLOOR
·ELEV OF HEAD·
·PLAN AT JAMB·
·DETAIL OF FRONT ENTRANCE·
SCALE 1½"·1'-0"
#8621
·ELEV OF SILL·

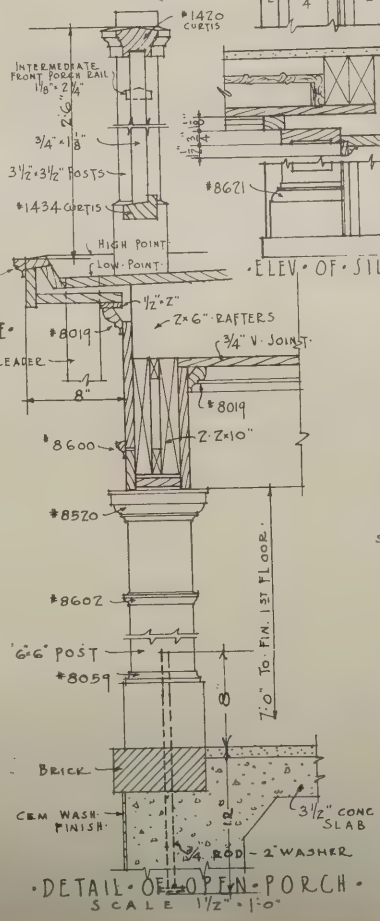
2¾"×4¼" LEADER
·ELEV OF LEADER HEADS·
SCALE 1½"·1'-0"

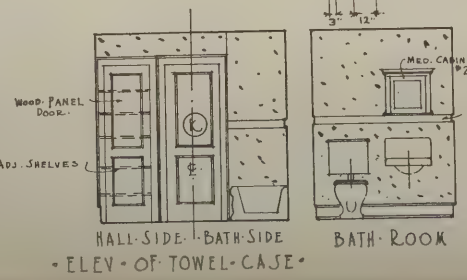

SHINGLES
#8600
7/8"·4½"
·SECTION·
·ELEV·
·DETAILS OF GABLE CORNICE·
SCALE 1½"·1'-0"


A
B
WOOD PANEL DOORS
PLASTER
6'-8"
ADJ. SHELVES
FIXED SHELF
·ELEVATION
·SEC. AT B·B
·SEC. AT A·A
·CASE IN SEWING ROOM
SCALE 1/4"·1'-0"


PLASTER
WOOD PANEL DOORS
ADJ. SHELVES
PANEL BACKS
SINK
MOULD BOARD
DRAWERS
SEAT END
TABLE
FLOUR BIN
·KITCHEN TOWARD REAR·


WOOD PANEL DOORS
ADJ. SHELVES
E
WOOD PANEL DOORS
REFRIG SPACE
SHELF
2'-0"
1'-8"
2'-0"
·KITCHEN TOWARD REAR ENTRY·


FACE OF WALL
SHINGLES
#8019
#8600
INTERMEDIATE FRONT PORCH RAIL 1⅛"·2¼"
#1420 CURTIS
3/4"×1⅛"
3½"×3½" POSTS
#1434 CURTIS
HIGH POINT
LOW POINT
½"·2"
2×6" RAFTERS
¾" V. JOINT
LEADER
8"
2·2×10"
#8520
#8602
6"·6" POST
#8059
7'-0" TO FIN. 1ST FLOOR
BRICK
CEM WASH FINISH
3½" CONC SLAB
¾" ROD · 2" WASHER
·DETAIL OF OPEN PORCH·
SCALE 1½"·1'-0"


SCALE 1/4"·1'-0"
3"
12"
WOOD PANEL DOOR
ADJ. SHELVES
MED. CABINET #2835
#8641
HALL SIDE
BATH SIDE
·ELEV OF TOWEL CASE·
BATH ROOM

PANEL ENDS
WOOD BRACKET
PANEL BACK
TABLE
SEAT
·KITCHEN TOWARD DINING ALCOVE·

Chicago Two-Family City Houses

How Two Chicago Builders Created a New Apartment District on an Odd-Sized City Block

CHICAGO has been the scene of many large housing developments in the past two years, and though construction work has been going on at an extremely lively pace, the demand for homes and apartments seems to be pretty well sustained. Among some of the recent projects is the Loeb-Hammel development in the Ravenswood district, which involved the construction of 26 two-apartment buildings of the city type. This operation was the private investment of Max Loeb and Leonard F. Hammel of the Loeb-Hammel Realty Co., and all sales were made through the company. The direction of the project and all details connected with construction were handled separately from the company's real estate affairs.

Max Loeb

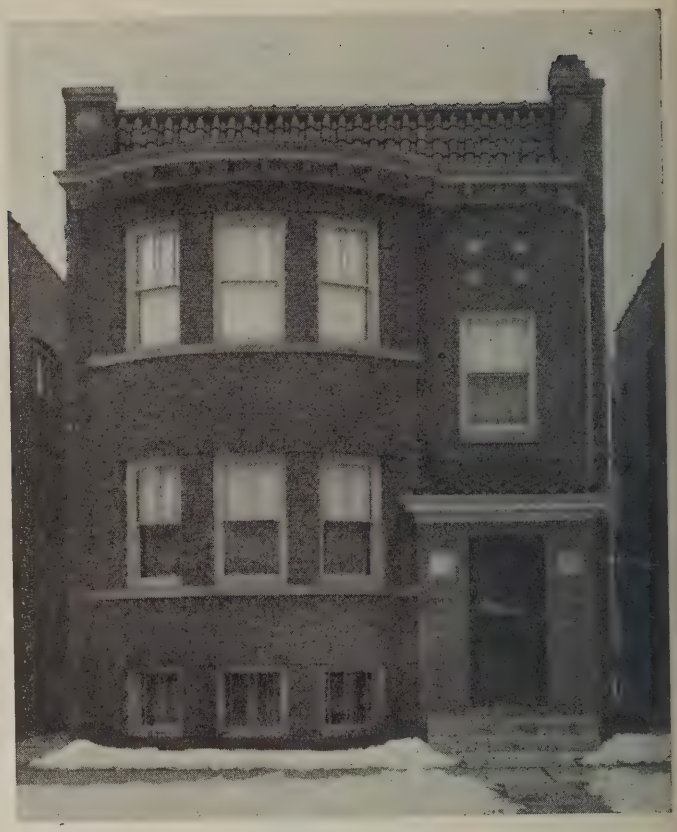
Early in 1922 a square block, bounded by Winnemac, Argyle, Leavitt and Oakley Avenues, was decided upon as a site. This piece of ground, unoccupied except for a 100-ft. strip at each end, had formerly been used for greenhouse purposes, but long before it was purchased the greenhouses had been wrecked and the site was nothing but a desolate, sunken prairie, overgrown with thistles and with an occasional concrete pillar sticking up above the weeds. It had remained in that state for many years, and because of its appearance no one seemed to have courage enough to try to make it productive, notwithstanding the fact that the surrounding neighborhood was built up with a good class of homes and apartments, and that good transportation to the downtown section was convenient.

The parcel of ground, when it was taken over by the builders, was 229 ft. deep and had a street frontage on Argyle and Winnemac Avenues of 400 ft. The 400 ft. frontage was divided into 13 lots on each street, each lot approximately 30 ft. wide, the width of an ordinary city lot. When it

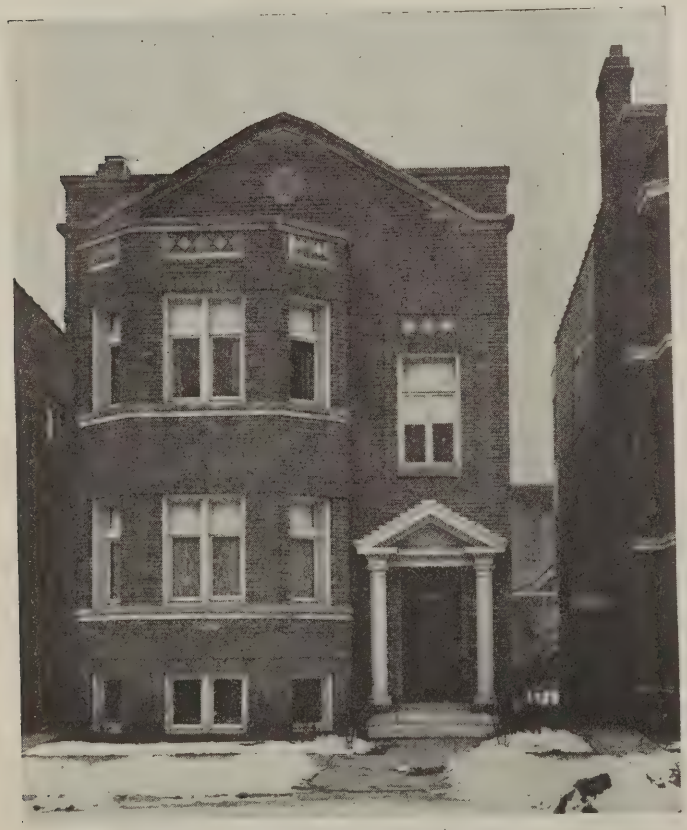
Leonard F. Hammel

View of the Loeb-Hammel development looking west on Argyle avenue

Dark red brick with green tile roof and canopied entrance. Wood and stucco trim



Yellow rough texture brick with cut stone trim and green tile roof. Metal cornice



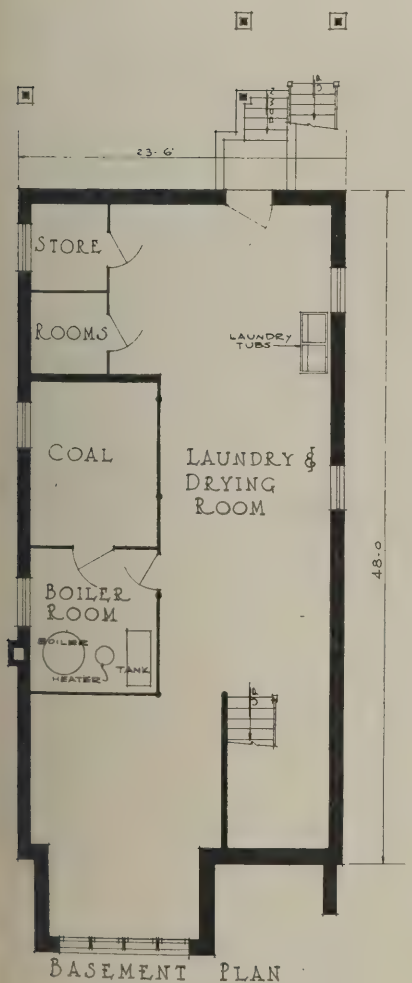
Yellow rough texture brick with cut stone trim. Wood trimmed entrance

Dark red brick with red tile roof. Wood and stucco trim with stone trimmed entrance

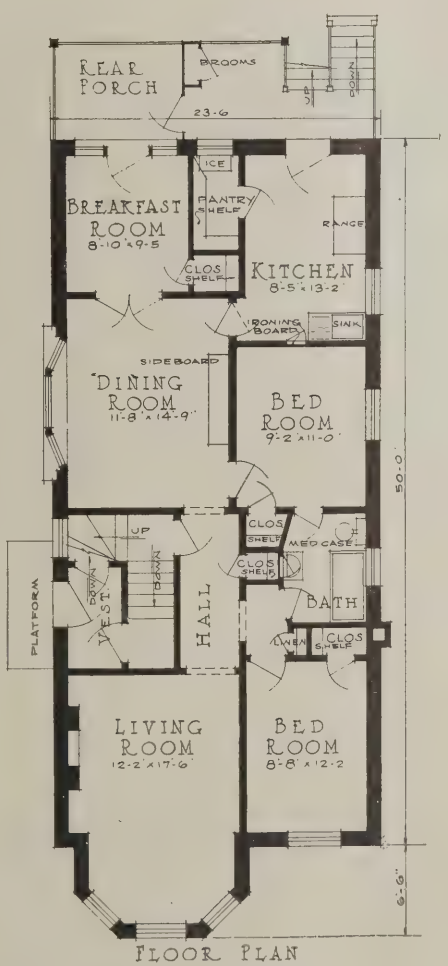
A few of the five-room-apartment houses. Note the differences in window openings and the treatment of the entrances

Yellow rough textured brick with green tile roof and trim. Metal cornice

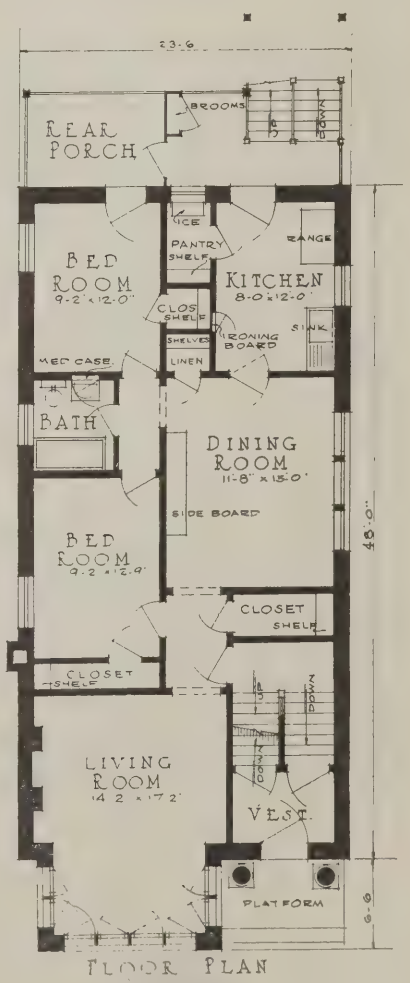
Dark red rough textured brick with red tile roof and cut stone sills. Metal cornice



Typical basement plan

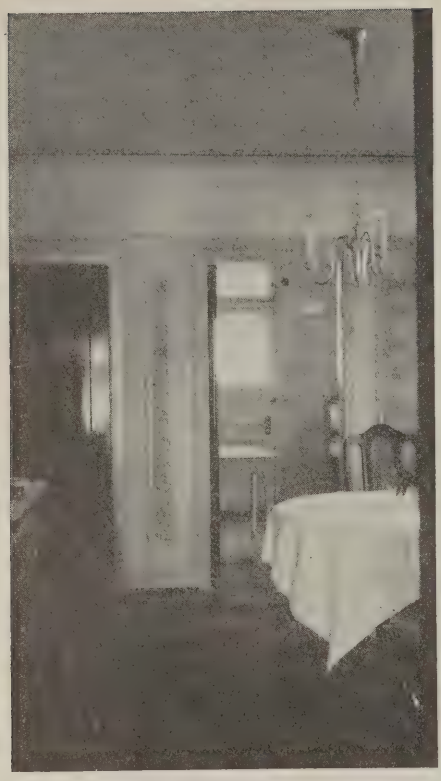


Typical six-room plan

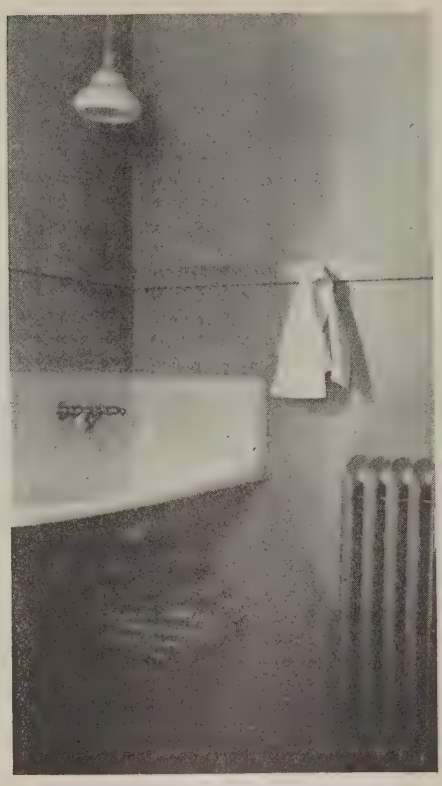


Typical five-room plan

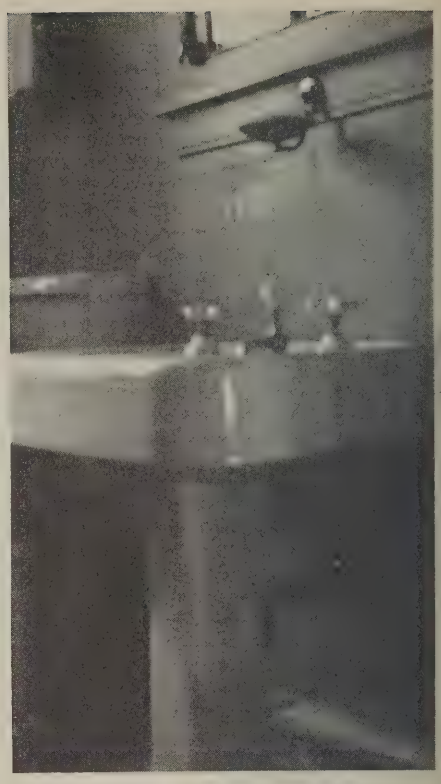
Two side-entrance, six-room-apartment houses. Note the different window treatments



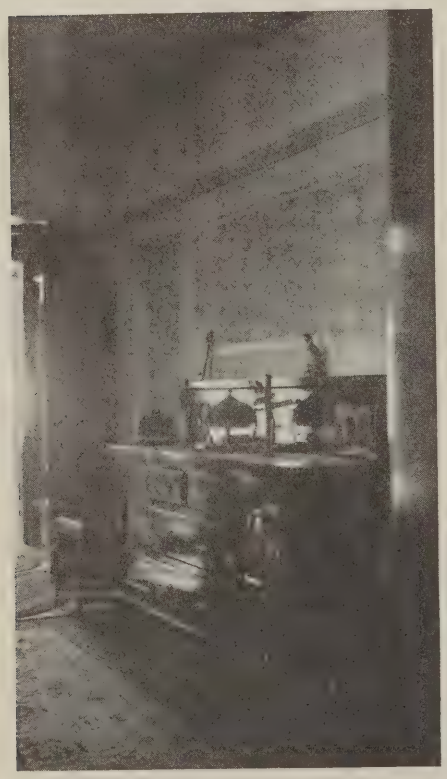
Looking toward kitchen from entrance to dining room



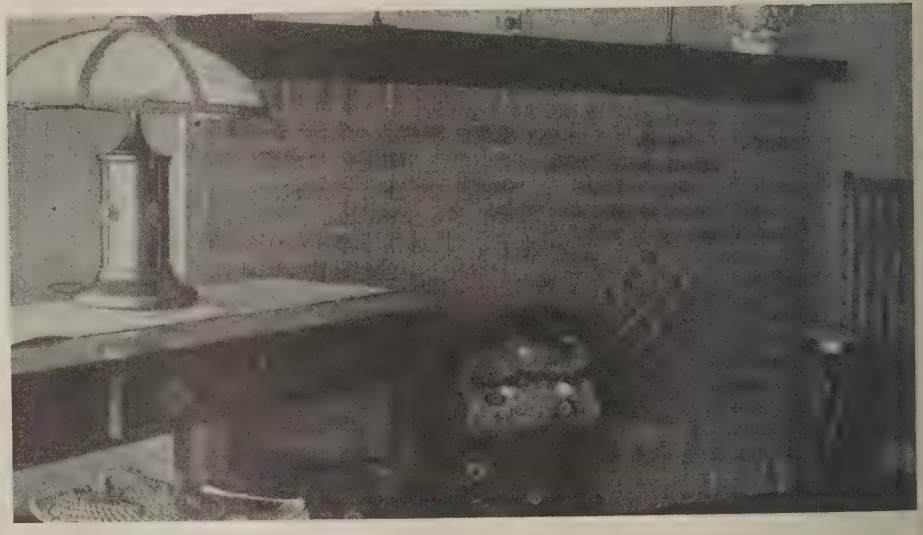
Corner in kitchen



Pedestal lavatory in bathroom



View showing dining room trim



Typical fireplace in living room

came to dividing the lots for length, another difficulty presented itself. Out of the 229 ft. width it was necessary to set aside 16 ft. for an alley, thus allowing 213 ft. to be split into two lengths of 106½ ft. each. This made an exceptionally short lot, as compared with the usual 125 ft. length, and in order to sell anything built on these 30 ft. by 106½ ft. lots some advantage would have to be offered in order to offset the drawbacks presented by the ground dimensions.

Taken all in all, the prospect was not promising, and it took a great deal of courage to attempt to improve the property. It was decided to build the 26 two-apartment buildings of such design and construction that the advantages offered in the buildings would be great enough to overcome the disadvantages offered by the site.

Soon after the purchase of the ground, Andrew Sandegren of Chicago was selected as architect and in April, 1922, construction was started under his supervision. By November of the same year all the buildings were finished and by the end of December they were all sold and occupied.

An interesting feature of these buildings is the fact that no two front elevations are alike. It was the intention of the builders and the architect to make the buildings look like individually built homes rather than a single development. A glance at the illustrations accompanying this article will show the diversity of styles expressed in the elevations.

The floor plans are of two types, one five rooms and the other six, with the six-room layout providing a side entrance. Both plans provide for a building 23 ft. 6 in. wide from outside wall to outside wall, though they

differ slightly in length, allowing 56 ft. 6 in. from outside sun parlor wall to outside rear wall for the six-room plan and 54 ft. 6 in. for the five-room layout. A notable feature of both plans is the large amount of closet space provided and the elimination of long hallways.

Another interesting feature is the basement layout. An inspection of the plan will show that the same degree of care was used in planning the basement as was applied to the upper floors.

All buildings were equipped with steam heat, one plant serving for the two apartments in each building. The bathrooms were built with tile floors and modern type fixtures. Movable buffets were furnished in the dining rooms and brick fireplaces were built in the living rooms. The kitchen arrangements provide for icing from the outside, and refrigerators and ranges were furnished by the builders.

The buildings containing five-room apartments were sold for $14,250 each, the six-room houses for $14,750 each and the six-room English basement type for $15,250.

All buildings carried a $7500 first mortgage bearing 7 per cent interest and payable in five years. The terms of payment were $2500 cash and the amount above the first mortgage payable at the rate of $150 per month. The rentals range from $85 per month for the five-room apartments to $100 per month for the six-room English basement type.

As Messrs. Loeb and Hammel do not maintain a building organization in connection with their firm, the various items in connection with the construction of the houses were let on sub-contracts and completed under the architect's supervision.

Special Framework for Balcony Construction

Use of Posts Under Balcony Avoided During Construction

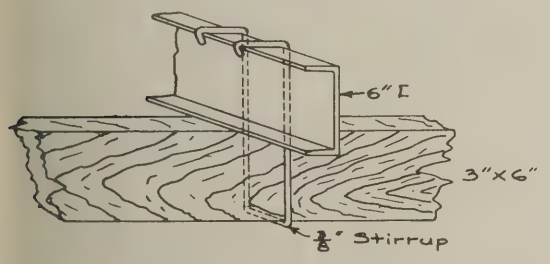
Special form work for theater construction, which avoided the necessity of posts during concrete placing

AN interesting problem is shown here in connection with the erection of a concrete balcony. The balcony was semi-circular in shape and supported on a steel substructure of trusses and I-beams. Ordinarily the form work for such a structure merely requires skill in form erection and the forms are supported on timber "tees" of the usual type. In this case, however, it was highly desirable that the space under the balcony be kept clear for the passage of trucks and the storage of materials, and this requirement made the usual method of form support inconvenient.

The means by which the forms were supported was a joist construction, wedged and blocked in place between the I-beam supports, as shown in the drawing. Inasmuch as the circular steps formed the beams and were therefore quite heavy, two pieces of 3x8 timber were set on blocks and wedges to carry them, as shown in Fig. 2. To prevent overturning, ⅞-in. battens were used. The heavy parapet along the balcony front was carried by a stirrup of ⅜-in. round steel, bent as shown in Fig. 3. This stirrup served to support a 3x6 joist which was extended far enough to the front to carry bracing.

The first step was carried on 3x6 joists hung on the 6-in. steel channels which formed the support for the entire front part of the balcony. Tongued and grooved decking was then nailed to the joists, butting against the 6-in. channel at the front. The curved steps were built with 2-in. plank bottoms in a manner similar to the parapet forms. They were made up of ⅞-in. pine, sprung to the curve of proper radius and nailed fast to blocks in order to keep the curve true. All curves were laid out by suspending a 4x4 post from the roof, accurately locating the center on the 4x4 with a nail, and using a steel tape, to describe the curve.

In erecting the form work, the front steps were set in place and "tacked," and the exact elevation desired marked on them. They were then taken up, ripped on a saw table and replaced. This gave a true edge for finishing the surface of the steps. The cost of erection exceeded somewhat the cost of post-supported forms, but the advantages gained more than offset the added expense involved.



STIRRUP DETAIL.

Fig. 3

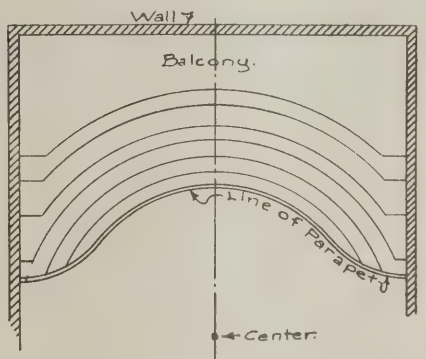


Fig. 1.

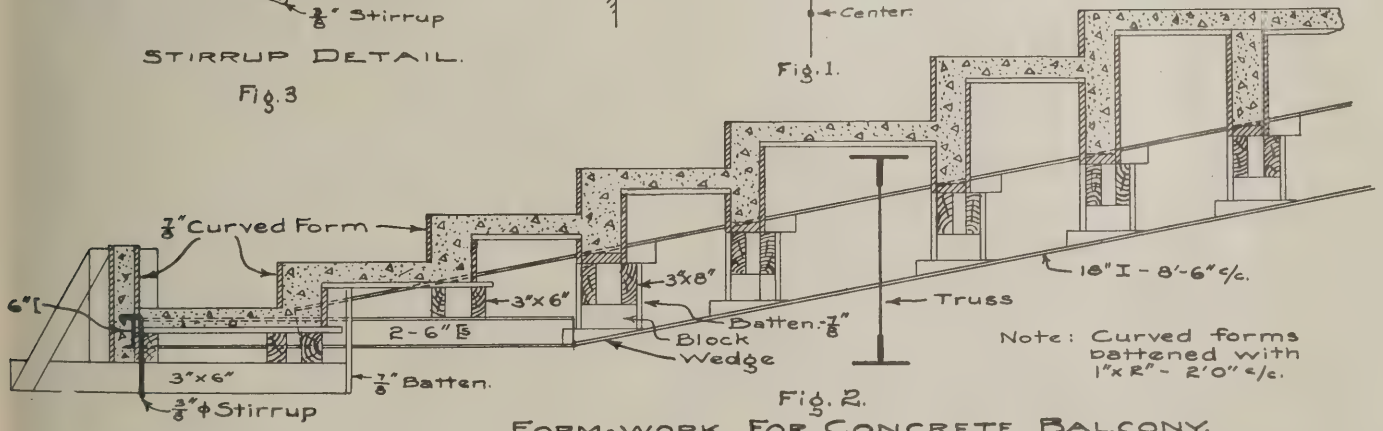


Fig. 2.

FORM-WORK FOR CONCRETE BALCONY.

Merchandising Houses

Builders and the Complete Plan—By H. T. Becker

NOT long ago work on a house that was being built came to a standstill, in a seemingly hopeless muddle. The owner had given his ideas to the builder the best he could, not being familiar with house construction. He said he wanted an English house. It happened that this contractor was not an architect, and design didn't mean a great deal to him. Being a builder and a good one, he thought in terms of dimensions and materials rather than types, and to him an "English" house might just as well have been an "Irish" house. But he knew how to build, and he started in. The owner tried to make clear what he was driving at, by verbal explanation. But the contractor didn't know what it was that was wanted. Consequently, the whole job came to a standstill, and an architect finally had to be called in, much to late to straighten things out in any sort of satisfactory way to any one concerned. As it should have happened the contractor ought to have insisted at the very outset that the owner employ an architect to translate his ideas to paper. This would have put the owner's wants into terms that the builder understood.

Overlooks Important Details

Another instance comes to mind, where the contractor lost money that he need not have lost had he insisted on having a complete plan. It was not a large amount, to be sure, but the small leaks are the ones that eat up the profits. In this case he had figured the lathing for a six-room, two-story house at seven cents a square foot, estimating that he had $56 worth, and gave the job to a workman for that amount. Half-way through, the lather quit on the job, saying that there was more than he bargained for, since it was a Dutch Colonial house, with the closets in odd-shaped corners. He demanded—and got—an extra $10 for the job. The point is this, if the contractor had had a complete set of plans, he could not have overlooked the fact that there was a little extra lathing and plastering to be done in a Dutch Colonial house, and could have figured accordingly. In this case, the money involved was not so important as the good feeling that was lost between the parties concerned.

One day a firm distributing house plans received a special delivery letter requesting a copy of one of their plan books. One copy had already been sent to the same address, but there was nothing unusual in this, nor even in the fact that it was a special delivery request. But several days later a long-distance telephone call came in from the same source. A very much perturbed contractor wanted a set of plans No. X-10 in the shortest possible time; in fact, his crew would have to be idle until he did get them. They had been working directly from the small plans shown in the book, and had got hopelessly "stalled." So his men were idle until the plans could be rushed out, and then had to tear out some of the work they had already done. Even then, they were unable to make the job entirely satisfactory. Perhaps the worst feature of it was the fact that the measurements had been just far enough off all the way through that stock trim and built-in features could not be used, and the mill bill was special. This caused several weeks' delay, and cost the owner quite a good deal more than he need have paid to get better material.

Plans Favor Fair Competition

We all have met in our business dealings, of course, the type of builder who purposely wants to work without complete plans, for the simple reason that it gives him a chance to underbid honest competition at the start, and later on to make his profit by a long list of extras. There are such, unfortunately for the building profession and for the home owner.

Of course, even the best of us sometimes make mistakes in figuring. The builder is only human. The other day a contractor friend walked into our office and asked us to look over a bid he had just prepared. "Will you give me $10 if I show you a $300 mistake?" he was asked. "Sure!" he agreed, "Because I didn't make any $300 mistake." But it was there. He had left out the plastering. Of course he might have overlooked this item if he had had a complete plan to work from, just as well as when figuring from rough sketches he prepared himself. But the chances are strongly in favor of the complete plan. You ought to protect yourself as far as possible against mistakes —your own and others'—by insisting upon complete plans showing every detail of the construction wanted.

You not only protect yourself in this way from giving a figure that is too low, but you get lower bids yourself from the sub-contractors on plumbing, masonry, heating, painting, wiring and other work. In making an estimate where guesswork is involved (as it is where the plans are not absolutely complete in all these details), it is just common business sense for each bidder to add a certain percentage to his estimate to protect himself. With a good, complete set of plans, he doesn't have to add anything, because each contractor knows exactly what he has to do and furnish, and what the others are figuring, and there is no guesswork about it. Each one can therefore give the general contractor a better price, because he can make an intelligent estimate, instead of a guess. The general contractor knows just exactly what he has to do in addition to these bids, and can intelligently figure up the labor, the material, and his own time.

Save Time and Energy

The average contractor has four or five jobs running at once, during the season. He can't be on each job all of the time. He must trust the actual construction work to his foremen. He lays out the day's work for each one and goes on about his business —which is to get new business and prepare estimates, and place orders. Suppose on one of these jobs, the work goes faster than anticipated, or something comes up that the workmen don't understand. Unless the contractor has given the foreman a set of complete plans to go by, so that they can go ahead, the whole job is held up until the contractor gets back to the job, perhaps the next day. This is what is bound to happen when there are no complete plans. The laborers can't get ahead as fast, and the contractor himself is losing valuable time that he could be putting in on more profitable work, instead of explaining to them how to go ahead, when they could just as well be getting this off the plans and specifications.

Signed Plans a Legal Contract

One point to be remembered in this connection also is that a set of blueprints, when signed by owner and contractor, constitutes a legal contract. This fact alone shows the value attached to complete plans in a court dispute. In the leading architectural offices of the country, where all the legal formalities of contract are made, the tracings of a new building are almost always signed by both parties, and constitute an official O. K. There can be no chance, with such complete plans, that the owner will make changes, leaving the contractor without a comeback.

In larger contracts, such as public buildings, a rising market can easily break a contractor financially unless he has the complete plans and can sign his orders the same day he takes the contract. With a complete set of plans, he knows just how many nails, just how many tile, just how much lumber and how many sacks of cement he is going to need. He doesn't have to wait until he gets the job that far along before he knows how much more he will need. He can let every sub-contract. Lumber may go up $20 a thousand in the next week. He is safe because his order was placed the day he signed the contract.

National Builder Style Sheet

Spanish type stucco bungalow at Montgomery, Ala. Polychrome stucco with red tile roof. Blinds are painted light blue. Note treament of arcade at left

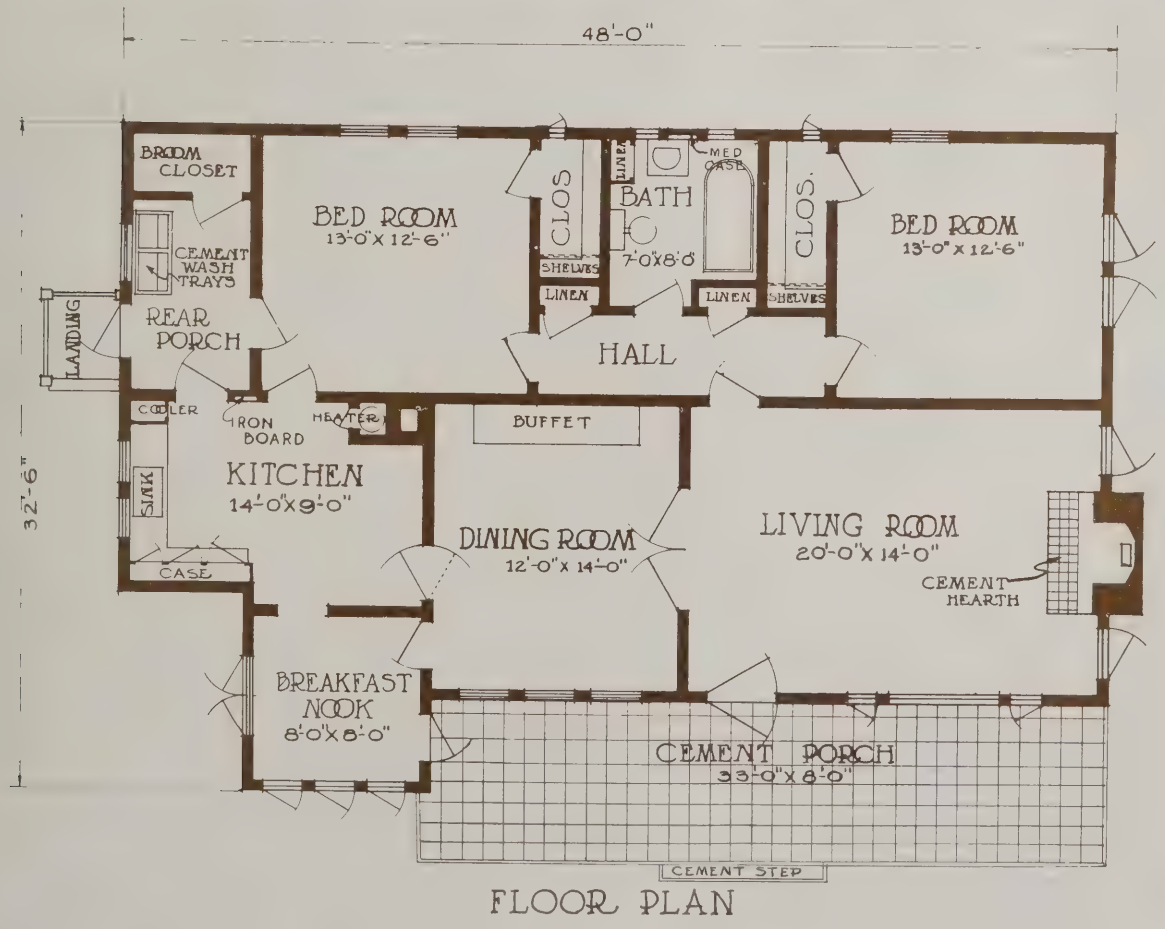
Bungalow of Shope concrete brick at Dallas, Texas, designed by Robertson and Griesenbeck, architects; built by the Christy-Dolph Construction Co.

A Stockton, Calif., house designed and built by F. P. Dobson, a builder. This house—No. 3—was priced at $5200, complete, including lighting fixtures, oak floors throughout, tiled hearth and porch, window shades, and a garage. Note particularly the real little breakfast room, rather than a mere alcove. The rear porch arrangement with ice box, or cooler, opening into the kitchen, and larder, with shelves, is quite unique. A study of the whole plan will show many original ideas

Floor plan of Bungalow No. 3, designed and built by F. P. Dobson, Stockton, Calif.

Fireplace and living room in Bungalow No. 3, designed and built by a National Builder subscriber—F. P. Dobson—at Stockton, Calif.

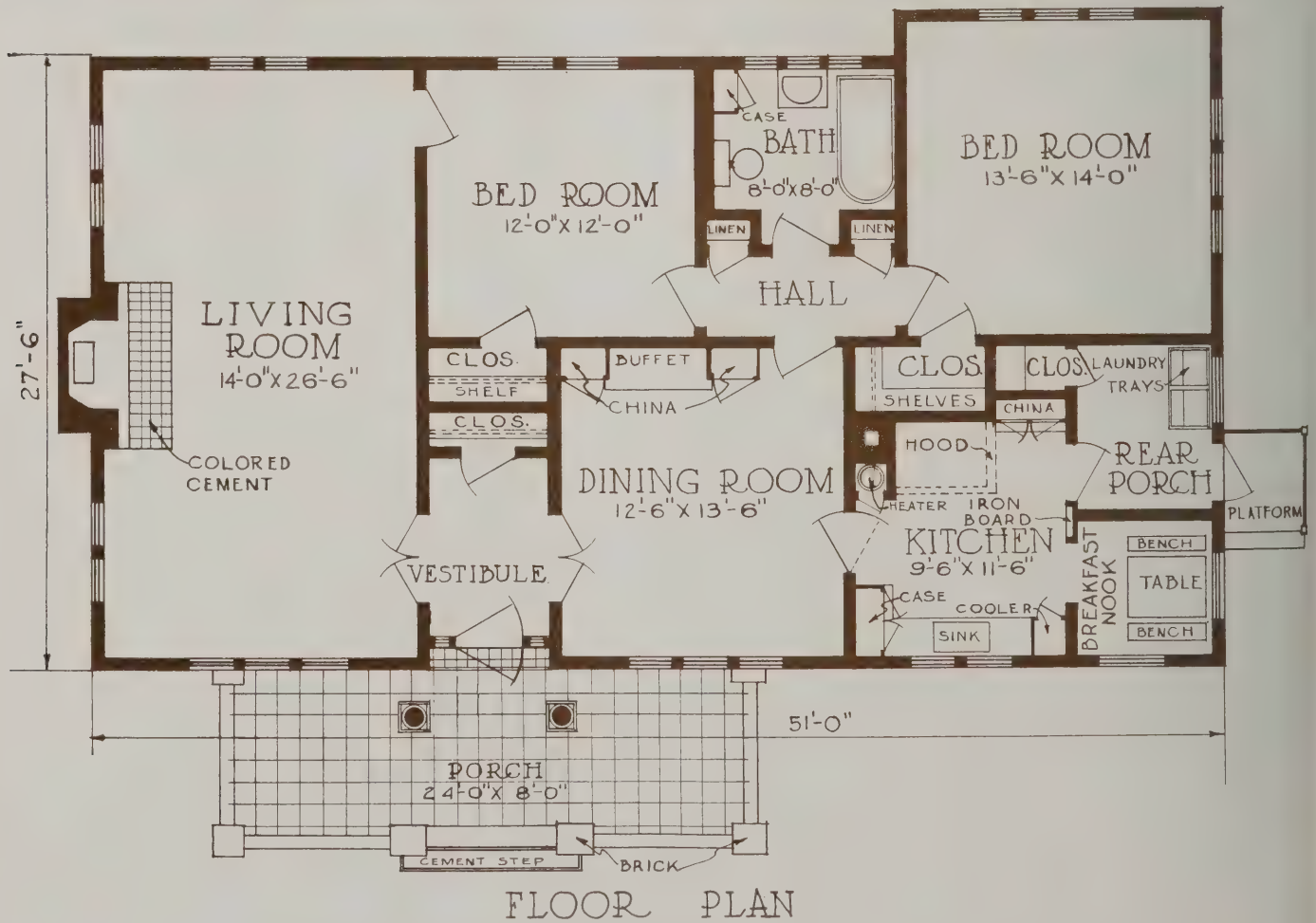
Another one of the F. P. Dobson bungalows—No. 2—at Stockton, Calif. This one was priced at $5300, including the garage



FLOOR PLAN

Floor plan of Dobson No. 2 bungalow. Note the convenient kitchen layouts and equipment

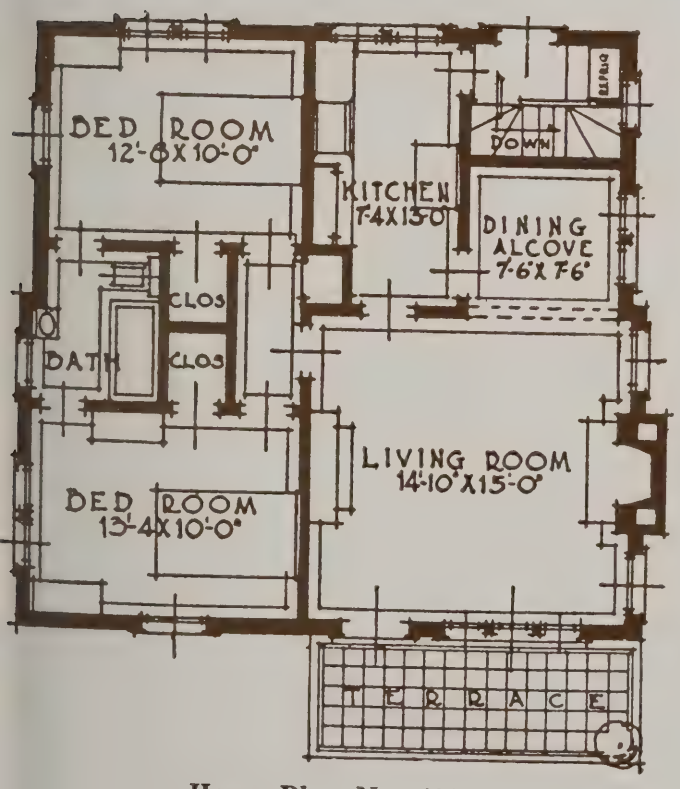
Bungalow No. 1, designed and built by F. P. Dobson, builder, of Stockton, Calif., and sold by him for $5200



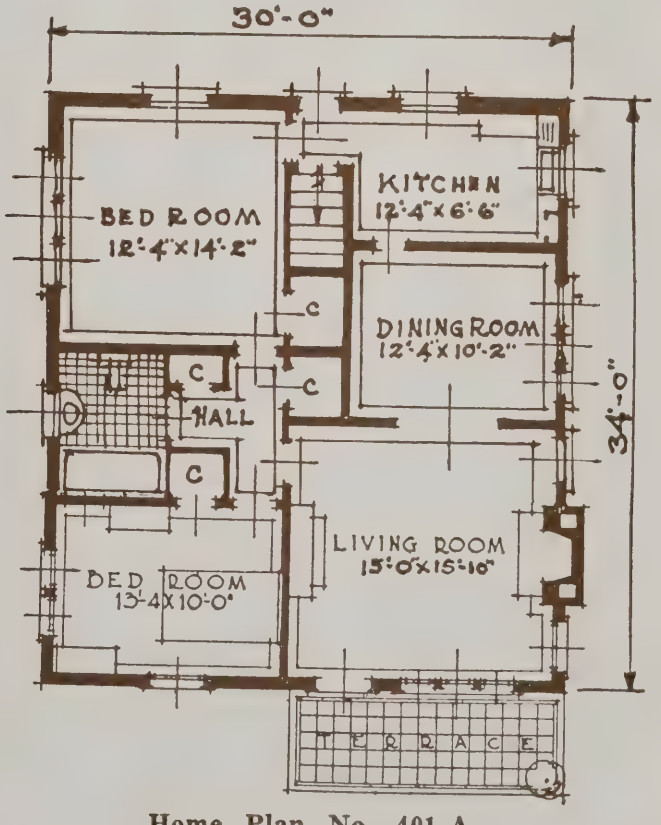
FLOOR PLAN

Floor plan of Dobson Bungalow No. 1, Stockton, Calif.

Spanish type bungalow No. 401, designed by the Mountain division of The Architects' Small House Service Bureau of the United States, and built at Denver, Colo.



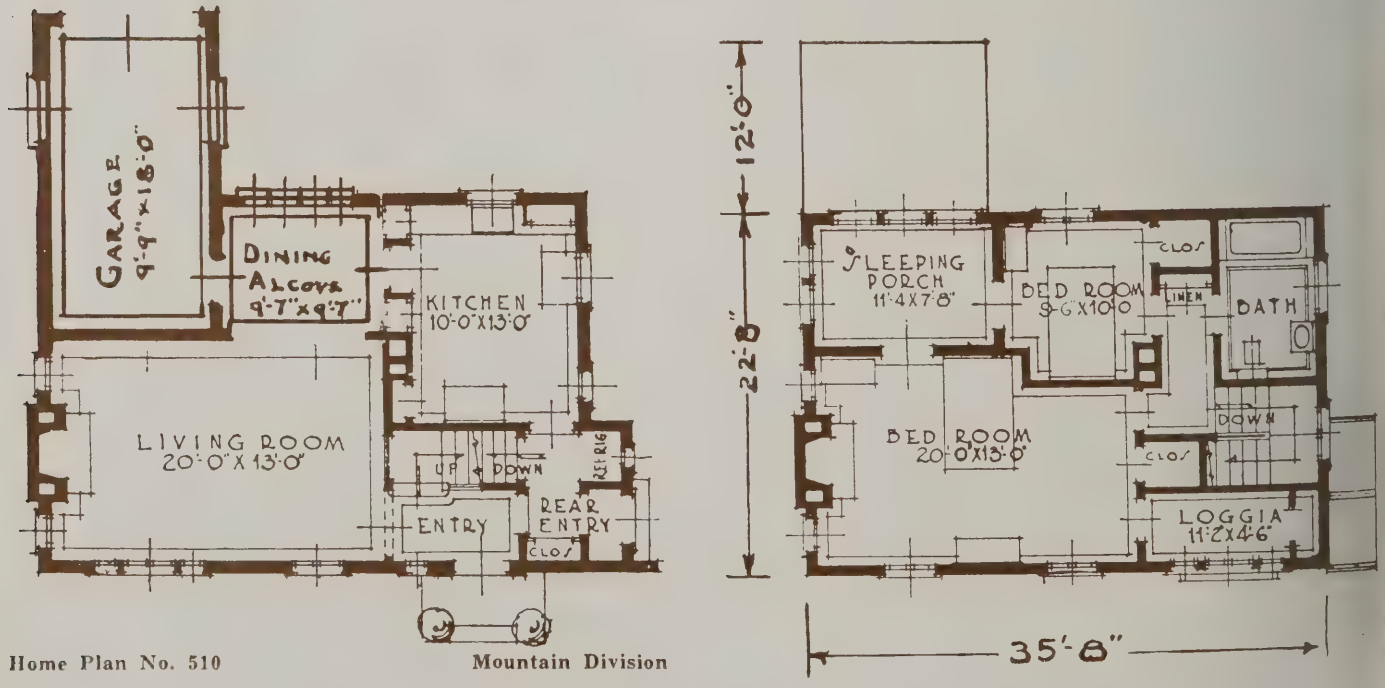
Home Plan No. 401



Home Plan No. 401-A

Alternate floor plans of Bungalow No. 401, designed by the Mountain division of The Architects' Small House Service Bureau of the United States (Denver, Colo.). Copyrighted by The Architects' Small House Service Bureau

Stucco house No. 510, designed by the Mountain division of The Architects' Small House Service Bureau of the United States at Denver, Colo.



Home Plan No. 510 Mountain Division

Floor plans of the stucco house shown above. Copyrighted by The Architects' Small House Service Bureau

A California bungalow of recent design—one of a genuine bungalow colony

A California stucco house of neat design—plain but just this plainness makes the effective background for the trees and shrubbery

English type house at Portland, Ore.; built by the Standard Brick & Tile Co.

Looking from conservatory into living-room

Floor plans

English House at Portland, Ore.

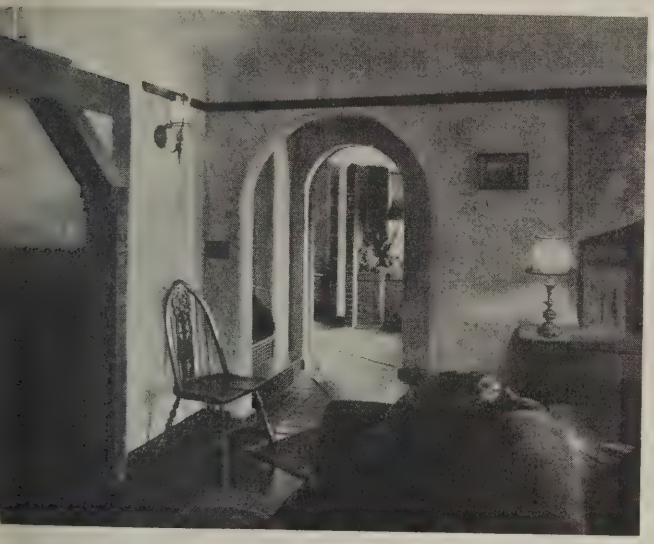
THE house illustrated on the opposite page was built primarily as a demonration house by the Standard Brick & ile Co. of Portland, Ore., and was degned by Otis C. Fitch, sales manager the company. It is constructed of ick, with the "Ideal" type hollow wall d contains six rooms, two baths, a small nservatory and an attached garage. here is one bedroom downstairs and two stairs.

The exterior is of the English cottage pe, with steep-pitched roofs and low ves. Leaded casement windows and ri-colored shingles serve to accentuate e English design. The interior, as well the exterior, has been designed in a ry unusual fashion. The living room is ilt with a high-domed ceiling and finished with rough-plastered walls and dark hardwood floors. At one end of the living room in an inglenook, which, with its massive brick fireplace and its view of the balcony, gives a truly European atmosphere to the room.

Aside from the description of the interior given above, our readers will undoubtedly be interested to "go behind the scenes" to learn something of the construction details and the cost of the house.

Exclusive of the lot, the actual construction cost was approximately $12,500. Between $3000 and $4000 of this amount was spent in the installation of several unusual features, such as: conservatory, bricked in fireplace recess; two complete, shower-equipped, tiled bath rooms; a costly gas furnace equipped with a "Minneapolis" heat regulator, electrically operated thermostat and eight-day clock; Brenco System automatic electric-gas hot-water heat control; built-in refrigerator with ice compartment opening into the rear entry; plastered basement walls and garage, special millwork and a multitude of built-in cupboards and linen closets with sliding drawers.

The house was opened to the public on January 28, 1923, and from that date to February 10, 1923, more than 5000 people have passed through its doors. Over 1000 adults were accommodated on a single Sunday and many were turned away. The construction was supervised by the designer and all work was done by local contractors.



Looking from west wall of living-room east through conservatory

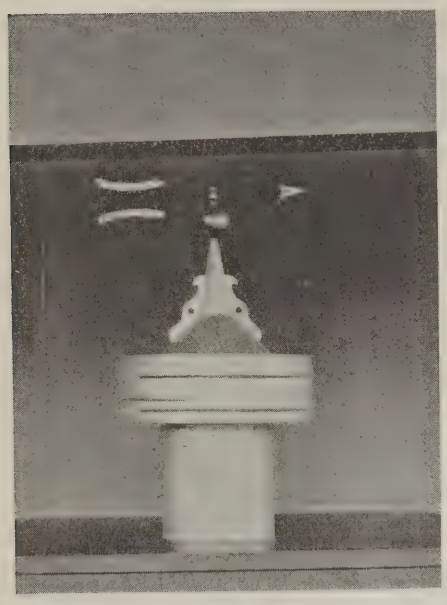
Dining-room. Note rough plastered walls

View from living-room to balcony

View of living-room from balcony above fireplace

New Tests of Roof Ventilators

Results of Tests Made by Prof. F. B. Rowley, Professor of Mechanical Engineering at University of Minnesota



Ventilator Type No. 4

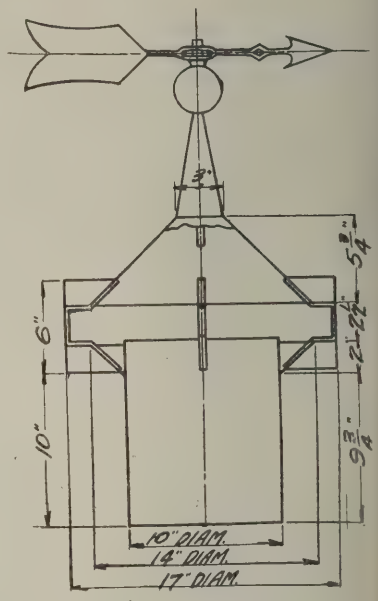
AN item of great importance to anyone erecting a farm structure is the selection of the ventilator. There are several types on the market, some which have proved satisfactory and others which have been found wanting in some essential detail. It has been a matter of chance, generally, as to what type of ventilator was finally selected, but certain research work, recently concluded has resulted in some definite information regarding the utility of different designs.

TABLE 1. TESTS OF ROOF VENTILATORS

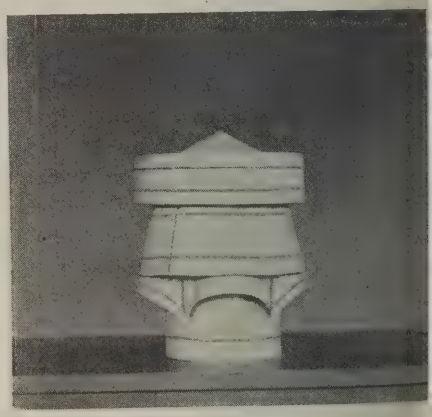
Test No.	Ventilator	Av. wind velocity	Av. velocity in ventilator pipe
1	1	453	201
2	2	452	178
3	3	451	155
4	4	447	94
5	5	455	95
6	1	835	434
7	2	816	419
8	3	813	338
9	4	815	283
10	5	830	246
11	1	1225	702
12	2	1272	710
13	3	1238	539
14	4	1255	474
15	5	1244	417
16	1	1593	940
17	2	1572	919
18	3	1573	754
19	4	1572	650
20	5	1549	555

Some interesting results have recently been published in the Journal of the American Society of Heating and Ventilating Engineers, on the comparative efficiency of various types of roof ventilators. The conclusions are based on the experiments of F. B. Rowley, Professor of Mechanical Engineering at the University of Minnesota.

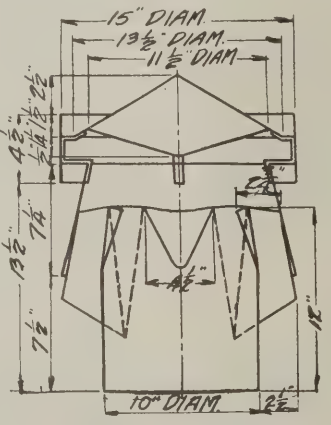
Five different types of ventilators, as illustrated, were used in the tests and all



Ventilator Type No. 4

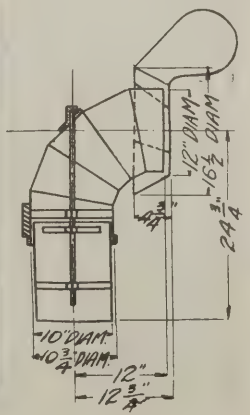


Ventilator type No. 5

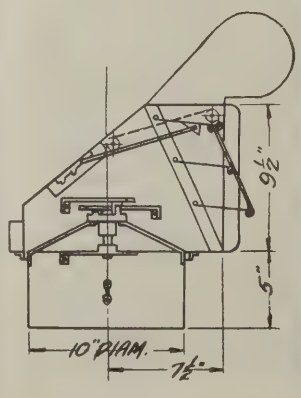


Ventilator Type No. 5

Ventilator Type No. 1

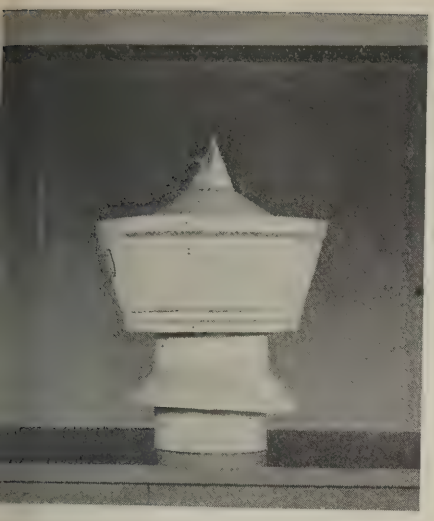


Type No. 1

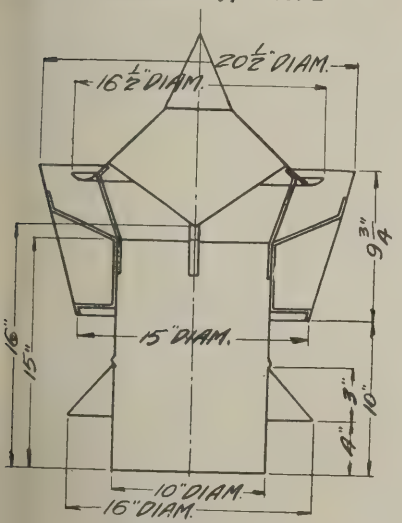


Type No. 3

Ventilator Type No. 3



Ventilator Type No. 2



Ventilator Type No. 2

nensions are given since it was appar- that the dimensions had a decided ect on the ventilator efficiency. A varia- n from the size indicated resulted in ecrease of efficiency, thus proving that proper dimensions had been selected. om the figures shown in the table it uld seem that the type of ventilator wn as Type No. 1 is most efficient.

anufacturers Agree upon One-Inch Lumber and Small Sizes

HE Permanent Standardization Commit- ee of the National Lumber Manufac- rs Association, meeting March 23, in Orleans, in connection with the annual ention of the Association, and repre- ing all constituent associations of the onal body, excepting one, which was not esented when the action was taken, ed upon standard finished sizes of lum- as follows:

hat 25/32 inch shall be the standard fin- l size, surfaced two sides, of all grades inch lumber, kiln dry basis, and 1⅝ es as the surfaced thickness of small nsion.

Those participating in this action represented about 90 per cent of the lumber manufactured in the United States. The lumbermen recognize that the standardization problem is a manufacturers' problem, and the sizes agreed upon represent the manufacturers' judgment as to the most economical and practical utilization of the forest product in lumber manufacture.

Good Builders and Poor Business Men

THE ranks of builders and contractors are recruited from year to year from journeymen carpenters, masons or other mechanics, more or less. Wage workers graduate into employers in other industries also, in different proportions according to the variation in capital necessary to make a start. Take the carpenter, however, as the most representative craftsman of the building business. He may be highly skilled as a craftsman and yet be a total failure as an employer, an employer even of himself. It is one thing to do a job of work and another thing to know how to sell it right. One is craftsmanship, the other is business comprehending business methods and business sense. The carpenter-builder or mason-contractor or whoever he might be that went into business for himself some years ago had an advantage that if he did not know his costs the material man didn't know his, either. Therefore there was a chance that whatever the mistakes the budding contractor made could be ragged out of the material man. In other words there was a sort of debatable land to fight over. But the debatable land has vanished. Business science has developed cost analysis and all material has rigid prices as compared with conditions a few years ago, so whatever mistakes the contractor makes "is up to him."

The small builder or contractor requires credit, and here is one of the worst stickers for the beginner with small capital. He does not realize that he can buy close by discounting his bills. He is so busy as a craftsman that he lets his accounts lie out and permits his customers to use his money. He needs his money much more than he needs his saws, hammer and nails. When a job is done he should bill it up and collect his money. He can then take advantage of discounts and pay his bills to the material man. What this earns him is shown in the accompanying table.

The Money That Can Be Made by Discounting Bills	Per cent per year
1 per cent in 10 days, net in 30 days....	18
2 per cent in 10 days, net in 30 days....	36
3 per cent in 10 days, net in 30 days....	54
3 per cent for cash, net in 30 days....	36
5 per cent in 10 days, net in 30 days....	108
2 per cent in 10 days, net in 60 days....	144
3 per cent in 10 days, net in 60 days....	216
2 per cent in 30 days, net in 60 days....	24
5 per cent in 30 days, net in 60 days....	36

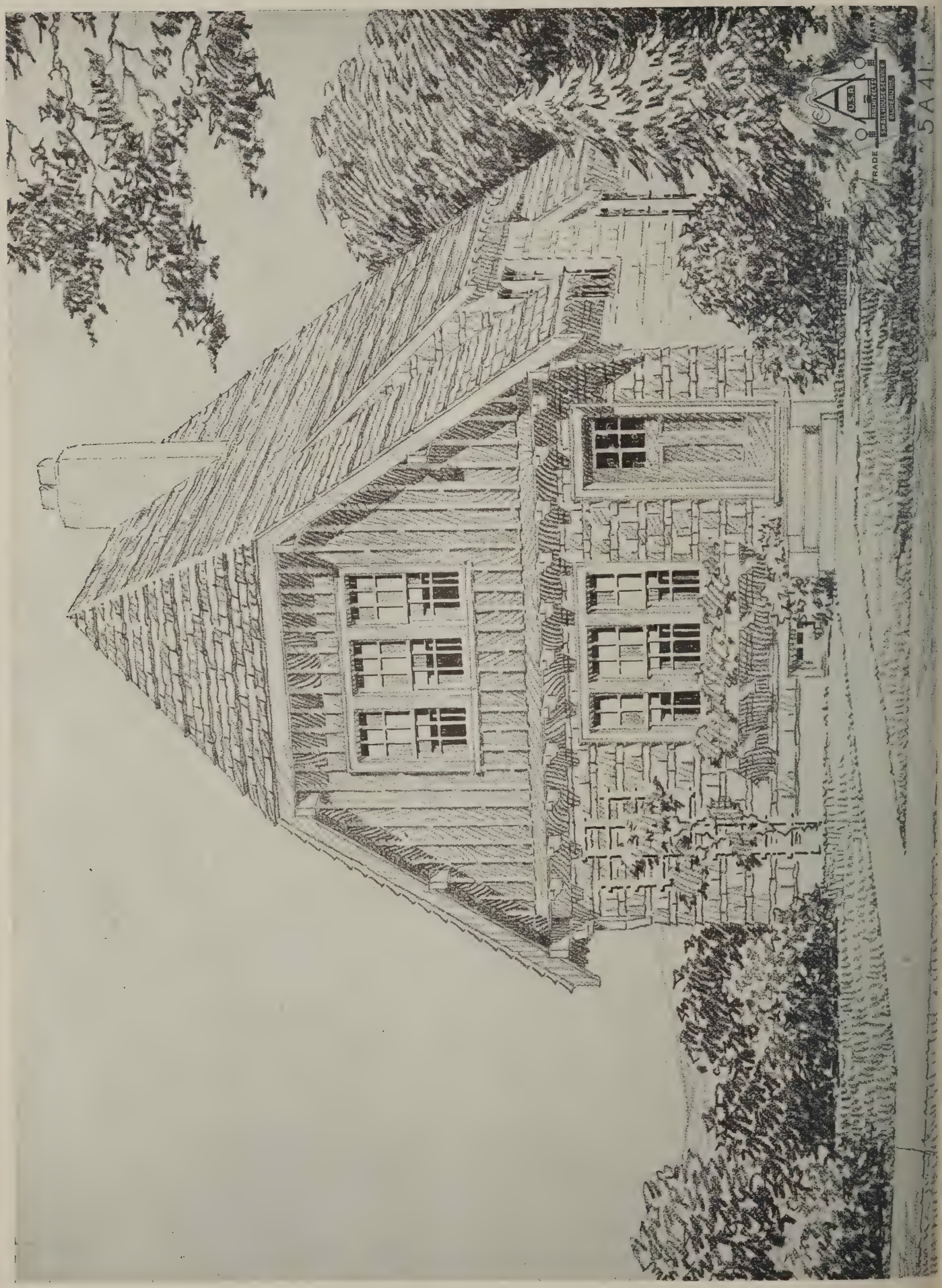
Research Shows No Poisoning from Brass or Copper Piping

IN RESPONSE to many inquiries regarding the effect on the human system of water run through copper or brass circulating pipes, we publish information on this subject furnished by the Copper and Brass Research Association of New York. They say that hundreds of thousands of brass pipe installations have been placed in use since 1870, when brass was first used for the purpose, and there is no record of a single case of illness or poisoning as a result. Aside from this fund of actual experience, the effect of copper (copper being the major constituent of brass) on the human body has been the subject of considerable research and study.

It is found to be a fact, for instance, that the food we eat contains more copper than we could ever obtain from copper or brass water-circulating piping. In a kilogram of barley, from 10 to 70 milligrams of metallic copper appear as a copper salt; cocoa contains 47 milligrams, and wheat, which forms the backbone of our diet, contains from 190 to 800 milligrams. The taste imparted if copper were present in the water would be so obnoxious as to serve as adequate warning. Pasteur, the eminent French scientist, says: "In regard to the toxicity of copper salts it may be said it is almost impossible to take a dose large enough to produce death, both from their horrible taste, and from the violent vomiting they produce. In small quantities the taste is not perceptible and the salts are not only tolerated but absorbed. Workers in copper are often completely saturated with the metal, but do not suffer from it. Copper normally exists in the human body. It gains entrance from foods and drinks in the absence of all adulteration."

In Cushny's "Pharmacology and Therapeutics on the Actions of Drugs," the following statement is made with reference to copper: "Animals have been fed with food containing large doses of copper for many months, apparently without any symptoms of poisoning, and copper is found so regularly in the tissues of man and animal that it may be regarded as a normal constituent, although its function is unknown and it may be merely stored up on its way to excretion. There is no reason to suppose that poisoning can be induced by small quantities of copper such as are contained in preserved vegetables or in food cooked in copper vessels."

Experiments have shown that there is no such thing as chronic copper poisoning, in the sense that there are cases of lead poisoning. Many water departments of large cities frequently use copper sulphate to rid their reservoirs of undesirable organisms, and in many large hotels uncoated copper utensils are used in the kitchens.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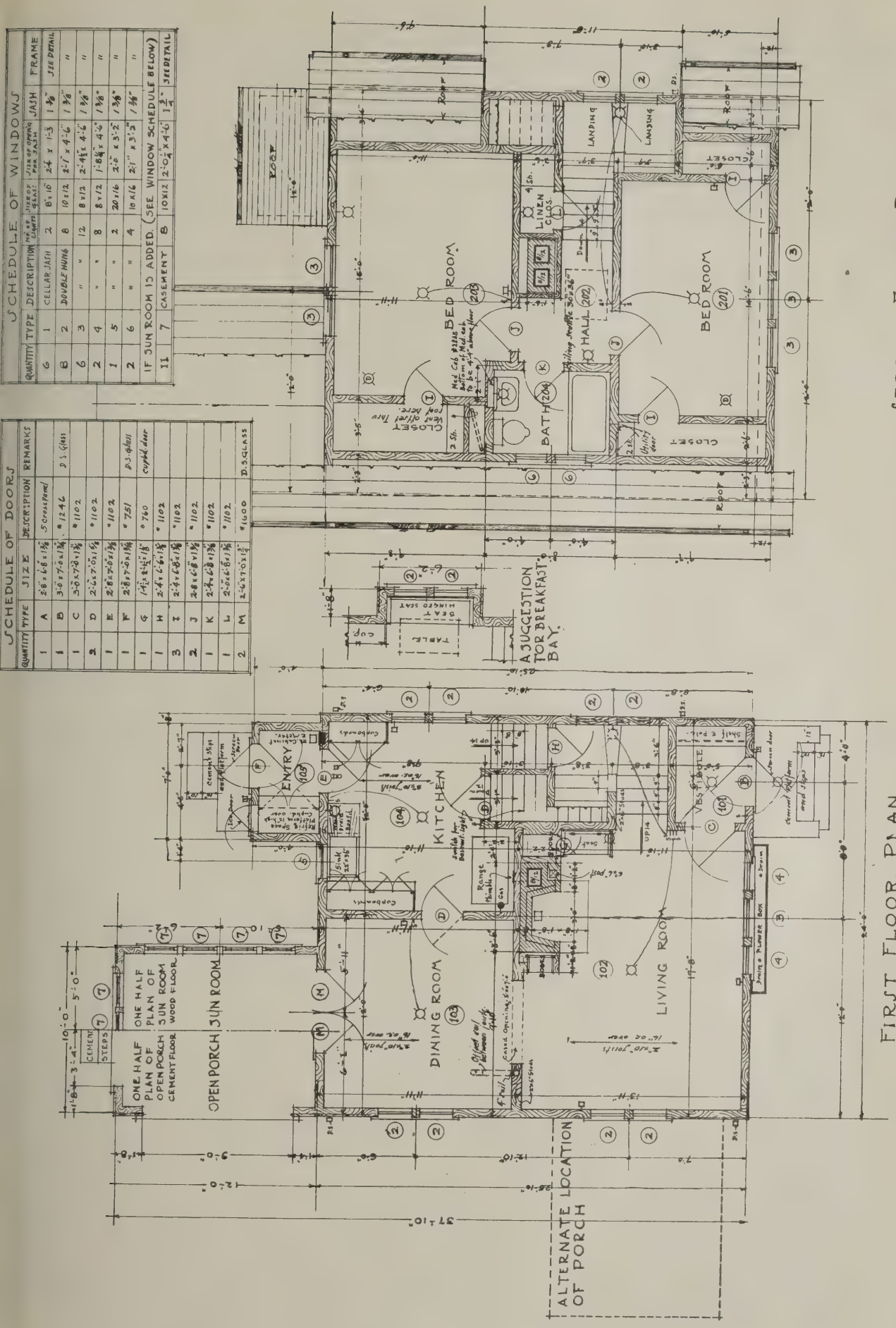

SCHEDULE OF WINDOWS
QUANTITY | TYPE | DESCRIPTION | NO. OF LIGHTS | SIZE OF GLASS | SIZE OF OPENING FOR SASH | SASH | FRAME
6 | 1 | CELLAR SASH | 2 | 8 x 10 | 2'4" x 1'3" | 1 3/8" | SEE DETAIL
8 | 2 | DOUBLE HUNG | 8 | 10 x 12 | 2'1" x 4'6" | 1 3/8" | "
6 | 3 | " " | 12 | 8 x 12 | 2'4 1/2" 4'6" | 1 3/8" | "
2 | 4 | " " | 8 | 8 x 12 | 1'8 1/2" x 4'6" | 1 3/8" | "
1 | 5 | " " | 2 | 20 x 16 | 2'0" x 3'2" | 1 3/8" | "
2 | 6 | " " | 4 | 10 x 16 | 2'1" x 3'2" | 1 3/8" | "
IF SUN ROOM IS ADDED. (SEE WINDOW SCHEDULE BELOW)
11 | 7 | CASEMENT | 8 | 10 x 12 | 2'0 1/4" x 4'0" | 1 3/8" | SEE DETAIL
SCHEDULE OF DOORS
QUANTITY | TYPE | SIZE | DESCRIPTION | REMARKS
1 | A | 2'8" x 6'8" x 1 3/8" | 5 Cross Panel |
1 | B | 3'0" x 7'0" x 1 3/8" | # 1246 | D.S. Glass
1 | C | 3'0" x 7'0" x 1 3/8" | # 1102 |
2 | D | 2'6" x 7'0" x 1 3/8" | # 1102 |
1 | E | 2'8" x 7'0" x 1 3/8" | # 1102 |
1 | F | 2'8" x 7'0" x 1 3/8" | # 751 | D.S. Glass
1 | G | 1'11" x 6'11" x 1 3/8" | # 760 | cupbd. door
1 | H | 2'4" x 6'8" x 1 3/8" | # 1102 |
3 | I | 2'4" x 6'8" x 1 3/8" | # 1102 |
2 | J | 2'8" x 6'8" x 1 3/8" | # 1102 |
1 | K | 2'4" x 6'8" x 1 3/8" | # 1102 |
1 | L | 2'0" x 6'8" x 1 3/8" | # 1102 |
2 | M | 2'6" x 7'0" x 1 3/4" | # 1600 | D.S. Glass
ROOF
BED ROOM
LINEN CLOS.
LANDING
CLOSET
HALL
BATH
BED ROOM
CLOSET
ROOF
ROOF
TABLE
A SUGGESTION FOR BREAKFAST BAY.
SECOND FLOOR PLAN
SCALE 1/4"-1'-0"
Scale
ENTRY
KITCHEN
DINING ROOM
LIVING ROOM
VEST. VESTIBULE
OPEN PORCH
SUN ROOM
ONE HALF PLAN OF OPEN PORCH CEMENT FLOOR
ONE HALF PLAN OF SUN ROOM WOOD FLOOR
CEMENT STEPS
ALTERNATE LOCATION OF PORCH
FIRST FLOOR PLAN
SCALE 1/4"-1'-0"
Scale

Floor plans of House No. 5A41, designed by the Northwestern division of The Architects' Small House Service Bureau. *Copyrighted*

Five-Room Swiss Chalet—House No. 5A41

Designed Especially for National Builder by the Northwestern Division of the Architects' Small House Service Bureau

THIS five-room house is 24 ft. wide. In some cities it may be accommodated on a 30-ft. lot. In other cities the lot should be 34 or 35 ft. in width. For a narrow lot, the porch, which may be of the open or closed type, should be placed at the rear. For a wider lot the porch may be placed at the side as noted.

This house is designed to face north or east. Reversed drawings for other facings are furnished without extra charge.

One enters this house through a vestibule in which there is provision for hanging coats. The large living room is made delightful by a fireplace, and by a large window directly opposite it. A flower box stands outside this window. A cased opening leads into the dining room. The kitchen is scientifically planned to save steps and labor. The drawings provide for a bay window in the kitchen in which there is a seat to serve as a breakfast nook. In the entry at the rear are placed the refrigerator and the electric meter. The stairway is of the combination type. One can go from the kitchen or the living room to the second story. In the second story there are two good size bedrooms each with a large closet and a bathroom.

The plans call for frame construction with an exterior finish of wide shingles and battens. There is a cement base course with cement steps to the doorway.

A full basement is provided with furnace room, fuel room and laundry.

The regular price of this plan is $25.50. (To NATIONAL BUILDER subscribers $13.)

EXCAVATING—181 cu. yd.

BACKFILL—40 cu. yd.

FOUNDATION—If 12" concrete, 39 cu. yd. gravel, 158 sax cement; if 9" concrete, 36 cu. yd. gravel, 146 sax cement; if 12" tile, 18100 CBM tile, 13 cu. yd. mortar; if 9" tile, 16000 CBM tile, 12 cu. yd. mortar.

CEMENT FLOOR—5 cu. yd. gravel; 4 cu. yd. sand; 50 sax cement; 2 cu. yd. sand steps; 1 cu. yd gravel steps; 18 sax cement.

CHIMNEY—1800 common brick; 100 fire brick; 18 sq. ft. hearth tile; 140 inside face brick; 64 lin. ft. 8x12 flue tile; 20 lb. fire clay; 2 cu. yd. mortar; 1 cast-iron ash dump; 1 throat and damper; 1 angle 4x3x5/16-4'0; 2—8x8 cleanout doors; 1—6" thimble; 1—8" thimble; 4 yd. metal lath.

LATH—9 sq. yd. metal lath over boiler; 9100 wood lath.

PLASTER—9 sq. yd. on metal lath; 650 sq. yd. on wood lath; 18 sq. yd. stucco on cement; 12 sq. yd. Keene's cement.

TILE FLOORS—35 sq. ft. ceramic tile; 22 lin. ft. cove base.

LUMBER—5—6x8-7 posts; 2—6x8-9 girders; 1—6x8-6 girder; 3—2x10-14 stair horses; 60 lin. ft. 2x4 basement partition plates; 18—2x4-8 basement partition studs; 200 ft. D & M basement partition sheathing; 4 ft. 2" plank cleanout cover; 3—2x10-16 box sill; 20—2x10-14 first-floor joist; 20—2x10-12 first-floor joist; 2—2x10-14 first-floor joist doubles; 2—2x10-12 first-floor joist doubles; 3—2x10-14 headers; 720 ft. com. bds. first-floor subfloor; 900 ft. 13/16x1½ first-floor finish floor; 7—2x6-5 joist; 1—2x6-8 header; 184 lin. ft. 1x4 bridging; 222 lin. ft. 2x4 first-floor partition plates; 66—2x4-9 first-floor partition studs; 3—2x10-18 stair horses; 4—2x4-14 opening doubles; 3—2x4-12 opening headers; 2—2x12-6 opening headers bearing partition; 7—2x4-5 entry ceiling joist; 20—2x10-12 second-floor joist; 20—2x10-14 second-floor joist; 3—2x10-16 second-floor joist; 4—2x10-14 second-floor joist headers; 660 ft. com. bds. second-floor subfloor; 870 ft. 13/16x1½ second-floor finish floor; 324 lin. ft. 2x4 second-floor partition plates; 92—2x4-8 second-floor partition studs; 21—2x4-14 second-floor ceiling joist; 4—2x4-8 second-floor ceiling joist; 2—2x4-16 second-floor ceiling joist headers; 315 lin. ft. 2x4 outside wall plates; 90—2x4-8 outside wall studs; 10—2x4-16 opening headers and doubles; 9—2x4-12 rafter plates; 30—2x4-10 gable studs; 48—2x4-24 rafters and headers; 15—2x4-10 rafters; 1—1x6-18 ribbon rafter; 7—2x4-6 rafters; 2050 ft. com. bds. roof sheathing; 17 M shingles; 1600 ft. shiplap wall sheathing; 8½ M shingles wall sheathing; 450 ft. batten board wall sheathing; 450 lin. ft. battens; 20—2x4-14 scaffold; 4—2x6-12 scaffold; 3—2x8-16 scaffold; 4—2x10-12 scaffold; 10—2x4-10 porch ceiling joist; 4—2x8-12 porch girder; 2—2x8-10 porch girder; 20—2x4-12 porch rafters; 4—2x4-16 porch gable studs; 1—1x6-14 ridge rafter; 200 ft. ceiling for porch.

MILLWORK—**Frames:** 4 single 8x10-2L-1⅜; 1 twin 8x10-2L-1⅜; 4 mul. 10x12-8L-1⅜; 1 triple 8x12-12L-1⅜; 1 triple center 8x12-12L (sides 8x12-8L-1⅜); 1 single 20x16-2L-1⅜; 1 mul. 10x16-4L-1⅜; 1 mul. 8x12-12L-1⅜. **Windows:** 6 sash 8x10-2L-1⅜; 8 wds. 10x12-8L-1⅜; 6—8x12-12L-1⅜; 2—8x12-8L-1⅜; 1—20x16-2L-1⅜; 2—10x16-4L-1⅜. **Storm Sash:** 6—8x10-2L-1⅛; 8—10x12-8L-1⅛; 6—8x12-12L-1⅛; 2—8x12-8L-1⅛; 1—20x16-2L-1⅛; 2—10x16-4L-1⅛. **Screens:** 6—8x10-2L-1⅛; 8—10x12-8L-1⅛; 6—8x12-12L-1⅛; 2—8x12-8L-1⅛; 1—20x16-2L-1⅛; 2—10x16-4L-1⅛. **Outside Door Frames:** 1—3'0x7'0-1¾; 1—2'8x7'0-1¾; 1 icing door frame; 1 double door frame, opng. 5'0x7'0-1¾. **Outside Doors:** 1—3'0x7'0-1¾ (No. 1246); 1—2'8x7'0-1¾ (751); 1 icing door; 2 doors 2'6x7'0-1¾ (1600). **Storm Doors:** 1—3'0x7'0-1⅛; 1—2'8x7'0-1⅛; 1 pr. st. dr. opng. 5'0x7'0-1⅛. **Screen Doors:** 1—3'0x7'0-1⅛; 1—2'8x7'0-1⅛; 1 pr. sc. drs. opng. 7'0x5'0. **Outside Millwork:** 4 barge boards 14'0; 2 barge boards 10'0; 2 barge boards 8'0; 2 barge boards 6'0; 4 barge boards 12'0; 14—4x8 dental brackets; 11—4x6 dental brackets; 240 lin. ft. cornice; 72 lin. ft. facia gable ends; 1—8'0 flower box; 25 sq. ft. trellis frame; 4 flower box brackets; 2 main cornice brackets; 2 opening frames 10'0x7'6; 1 opening frame 7'0x7'6; 50 lin. ft. ceiling cove. **Interior Doors:** 1 — 2'8x6'8-1⅜ (5XP); 1 — 3'0x7'0-1⅜ (1102); 2 — 2'6x7'0-1⅜ (1102); 1 — 2'8x7'0-1⅜ (1102); 1 — 1'6x5'0-1⅜ (760); 1 — 2'4x6'6-1⅜ (1102); 3 — 2'4x6'4-1⅜ (1102); 2 — 2'8x6'8-1⅜ (1102); 1 — 2'4x6'8-1⅜ (1102); 1 — 2'0x6'8-1⅜ (1102). **Jambs:** 1—2'8x6'8; 1—3'0x7'0; 2—2'6x7'0; 1—2'8x7'0; 1—1'6x5'0; 1—2'4x6'6; 3—2'4x6'4; 2—2'8x6'8; 1—2'4x6'8; 1—2'0x6'8; 1—5'0x7'0. **Interior Trim:** 4 sides single 8x10-2L; 1 side twin 8x10-2L; 4 sides mul. 10x12-8L; 1 side triple 8x12-12L; 1 side triple, center 8x12-12L, sides 8x12-8L; 1 side single 20x16-2L; 1 side mul. 10x16-4L; 1 side door 3'0x7'0; 1 side door 2'8x7'0; 1 side icing door; 2 side door 2'8x6'8; 2 side door 3'0x7'0; 4 side door 2'6x7'0; 2 side door 2'8x7'0; 2 side door 1'6x5'0; 2 side door 2'4x6'6; 6 side door 2'4x6'4; 4 side door 2'8x6'8; 2 side door 2'4x6'8; 2 side door 2'0x6'8; 2 side trim 5'0x7'0; 1 flight basement stair and rail; 1 flight main stair and rail; 1 flight kitchen stair; 1 scuttle door 30x36"; 1 jamb 30x36"; 1 side trim 30x36"; 1 utility door; 1 utility door jamb; 1 side trim; 1 medicine cabinet No. 2835; 1 meter cabinet; 1 entry cupboard; 1—5'0 kitchen cupboard; 1—3'6 kitchen cupboard; 1 mantel shelf; 1—3'0 living room seat; 24 lin. ft. closet shelving; 40 lin. ft. closet hook strip; 20 lin. ft. closet clothes rod; 550 lin. ft. base; 550 lin. ft. base shoe; 550 lin. ft. base molding; 107 lin. ft. ceiling cove; 218 lin. ft. picture molding; 24 lin. ft. band molding; 6 lin. ft. threshold; 1 drain board; 1 side mul. trim 8x12-12L; 1 side double door trim 5'0x7'0; 1 astragal for 7'0 doors; 6 lin. ft. threshold; 1 cellar frame 30x24-1L; 1 cellar sash 30x24-1L-1⅜; 1 cellar screen 30x24-1L-1⅛. **Note:** If dining room, living room and vestibule are changed, it will affect the following items included in above: 1 door 3'0x7'0-1¾ (1246); 1 side trim 3'0x7'0; 1 door 3'0x7'0-1⅜ (1102); 1 jamb 3'0x7'0; 2 sides trim 3'0x7'0; 1 door 2'6x7'0-1⅜ (1102); 1 jamb 2'6x7'0; 1 side trim 2'6x7'0; 1 opng. jamb 5'0x7'0; 2 side trim 5'0x7'0; 1 mantel; 1—3'0 seat; 3 sides mul. trim 10x12-8L; 1 side triple trim, center 10x12-8L, sides 8x12-8L; 1 flight main stairs to landing; 100 lin. ft. base; 100 lin. ft. base shoe; 100 lin. ft. base molding; 107 lin. ft. ceiling cove; 100 lin. ft. picture molding.

HARDWARE—6 cellar sash sets; 19 sash locks; 19 sash lifts; 25 storm sash sets; 25 screen sets; 1 front door set with butts; 1 rear door set with butt; 1 icing door set with butts; 2 storm door sets; 2 screen door sets; 1 floor hinge; 2 push plates; 13 inside door sets with butts; 18 door bumpers; 3 doz. clothes hooks; 1500 lb. assorted nails; 6 lb. assorted brads; 470 lb. sash weights; 4 hanks sash cord; 4 stairs rail brackets; 1 pr. hinges for scuttle door; 4 friction stays, utility door; (medicine cabinet: 1 pr. ornamental butts, 1 cupboard turn); (meter cabinet: 1 cupboard turn, 1 pr. ornamental butts); (entry cabinet: 4 pr. ornamental butts, 2 cupboard turns, 2 elbow catches); 1 bracket for drain board; (kitchen cabinet: 6 pr. ornamental butts, 3 cupboard turns, 3 elbow catches, 2 drawer pulls); (kitchen cabinet: 10 pr. ornamental butts, 5 cupboard turns, 5 elbow catches, 1 bin pull, 1 set castors, 2 drawer pulls, 1 molding board pull); 1 pr. hinges for seat; 1 double door outside set with butts; 1 double storm door set; 1 double screen door set.

INSULATION—5 rolls felt for roof; 3 rolls felt for walls; 3 rolls felt for floors; 1600 ft. of ½-in. flaxlinum or equal walls; 600 ft. of ½-in. flaxlinum or equal ceiling.

REINFORCING STEEL—16 rods ⅜" round-5'0.

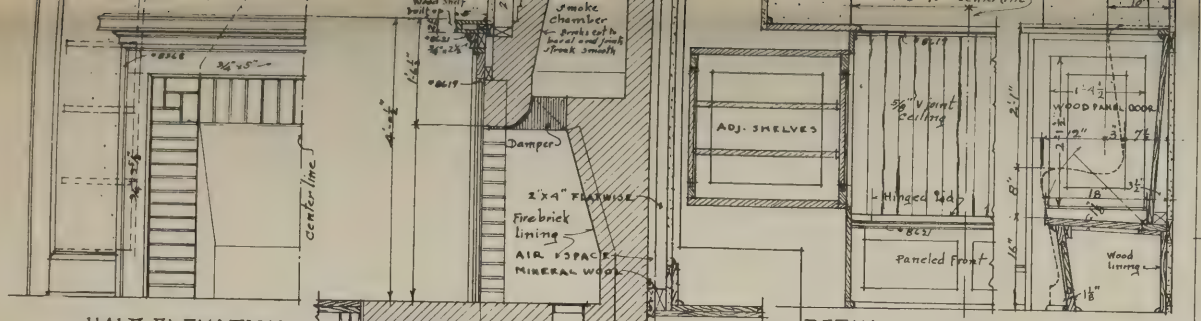
TINWORK—30 lin. ft. ridge roll; 3 finials; 22 lin. ft. dormer roof flashing; 96 lin. ft. flashing; 1—8'0 flower box lining; 92 lin. ft. gutter; 13 gutter ends; 26 gutter hangers; 7 nipples; 7 strainers; 7 offsets; 7 elbows; 5 shutoffs; 62 lin. ft. conductor; 18 conductor hooks; 22 lin. ft. flashing tin; 12 lin. ft. chimney flashing; 200 tin shingles.

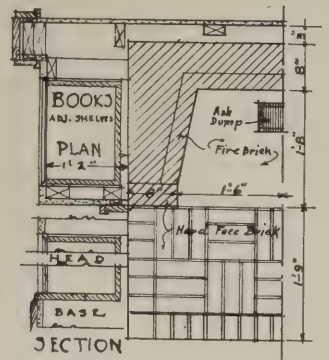
EXTERIOR PAINTING—43 gal. shingle and wood stain; 5½ gal. trim paint; 1 gal. boiled oil; 25 gal. shingle stain roof; 1 gal. porch paint; 1 gal. screen paint; 1 gal. sash paint; ¼ gal. shellac; 1 gal. japan; 1 gal. turpentine; 6 lb. putty.

INTERIOR PAINTING—12 gal. white paint; 8 gal. enamel; 5 gal. filler; 2 gal. shellac; 9 gal. varnish; 3 gal. floor shellac; 4 gal. floor varnish; 2 gal. oil; 1 gal. japan; 1 gal. turpentine; 1 gal. alcohol; 3 doz. sheets sandpaper; 3 lb. steel wool.

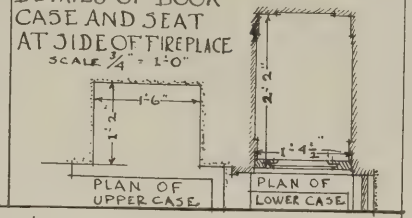
CAULKING—5 single frames; 6 mullion frames; 2 triple frames; 2 door frames; 1 icing frame; 1 double door frame.

WEATHER STRIPPING—6 sash 8x10-2L; 8 wds. 10x12-8L; 6 wds. 8x12-12L; 2 wds. 8x12-8L; 1 wd. 20x16-2L; 2 wds. 10x16-4L; 1 door 3'0x7'0; 1 door 2'8x7'0; 2 doors 2'6x7'0.

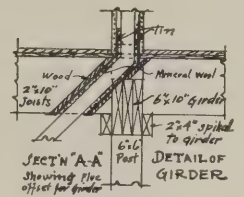


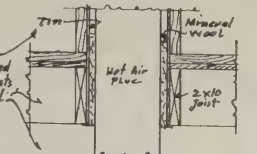


DETAILS OF FIREPLACE
Scale 3/4" = 1'-0"



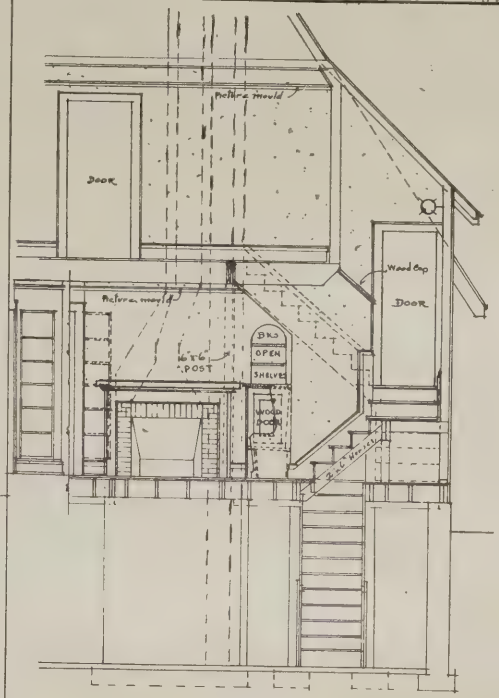
DETAILS OF BOOK CASE AND SEAT AT SIDE OF FIREPLACE
SCALE 3/4" = 1'-0"



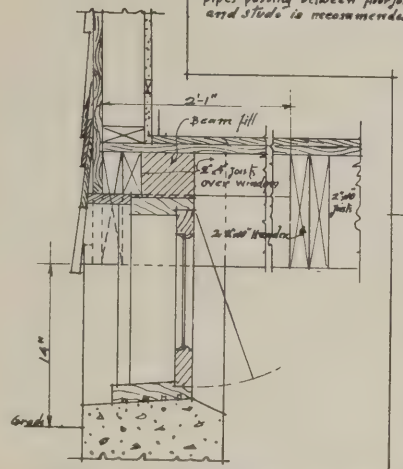


In case Hot air Furnace and piping are used, this method of Firestopping around pipes passing between floorjoists and studs is recommended.

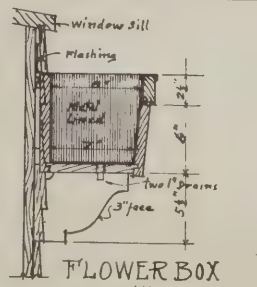
DETAIL OF HOT AIR FLUE INSTALLATION



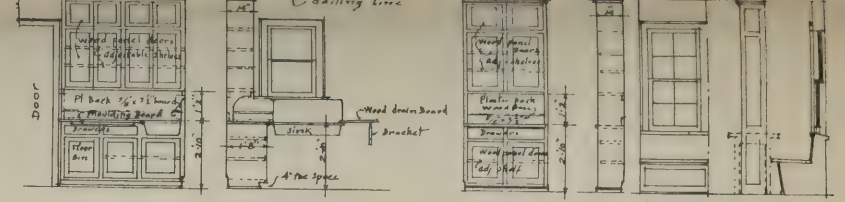
SECTION THROUGH STAIRS
Scale 1/4" = 1'-0"



DETAIL OF BASEMENT WINDOW AND FRAMING FOR SAME
Scale 1 1/2" = 1'-0"

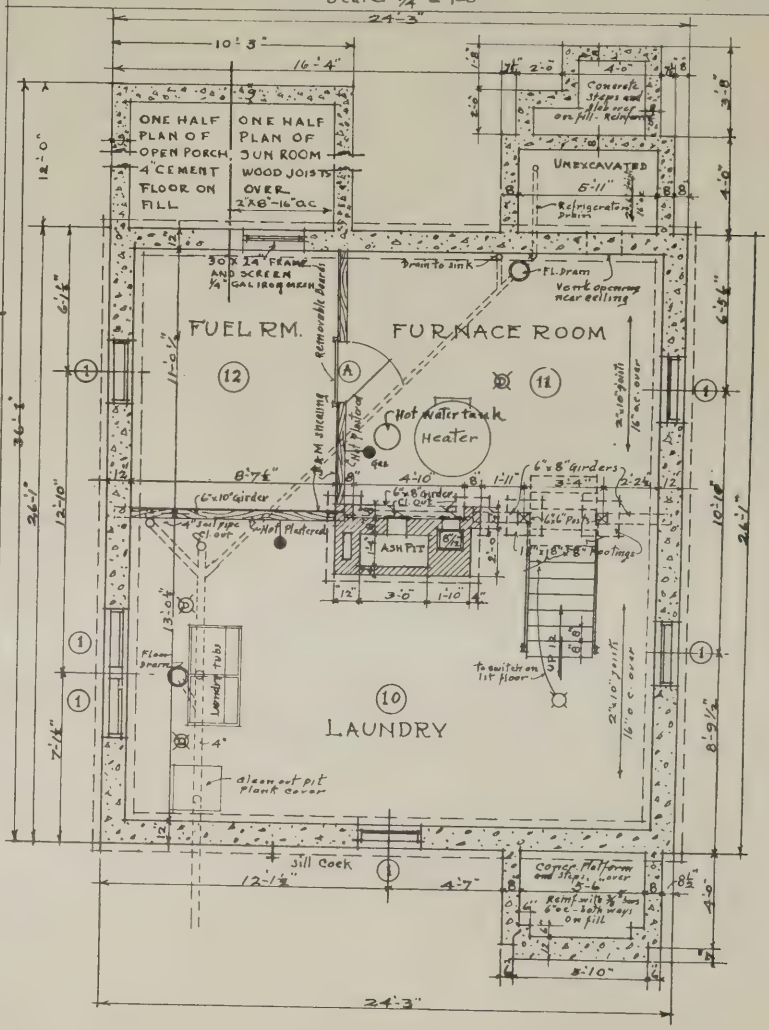


FLOWER BOX
Scale 1 1/2" = 1'-0"



KITCHEN CUPBOARDS
Scale 1/4" = 1'-0"

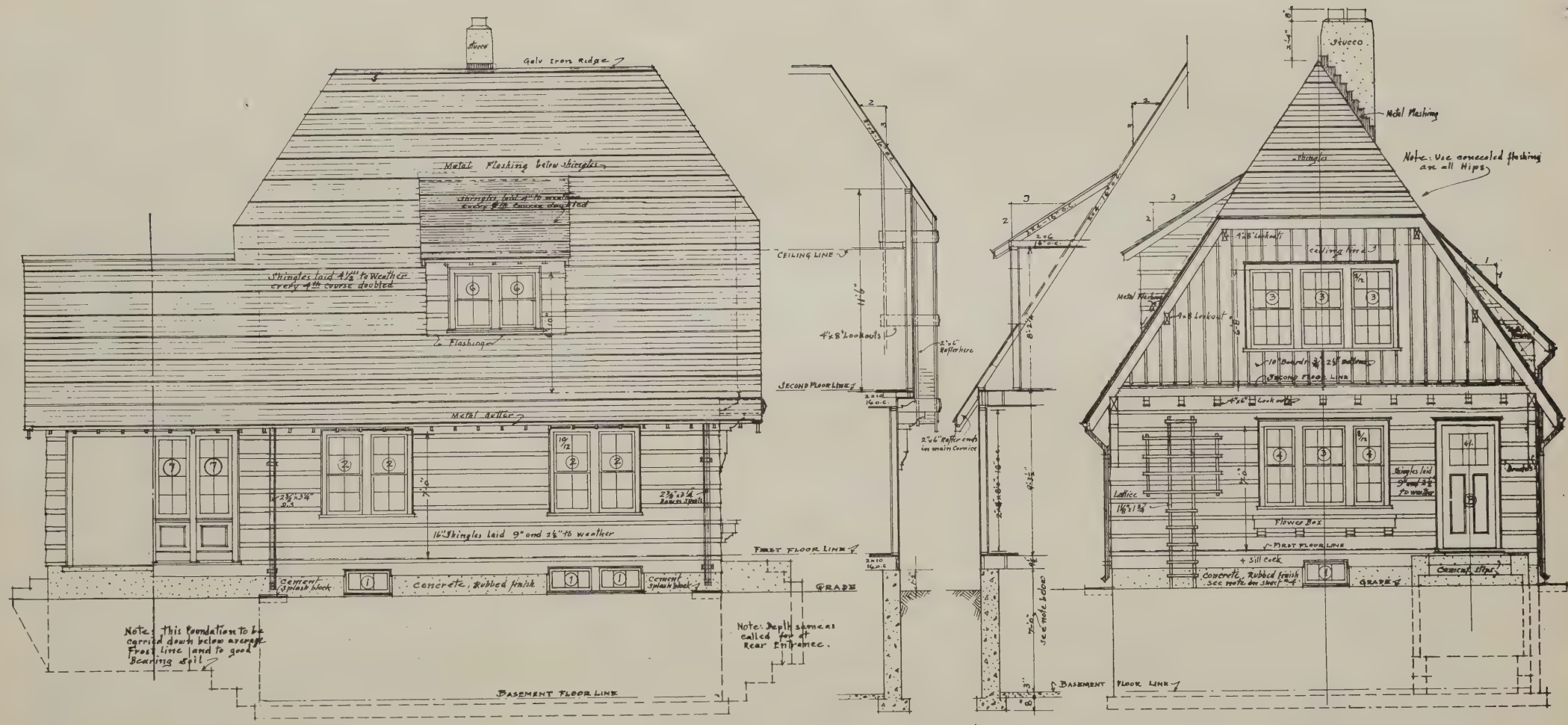
SUGGESTION FOR BREAKFAST BAY



BASEMENT PLAN
Scale 1/4" = 1'-0"

1 2 3 4 5 6 7 8
Scale

Details and basement plan of House No. 5A41, designed by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc. Copyrighted



SIDE ELEVATION
SCALE 1/4" = 1'-0"
1 2 3 4 5 6 7 8
Scale

FRONT AND SIDE SECTIONS
SCALE 1/4" = 1'-0"

FRONT ELEVATION
SCALE 1/4" = 1'-0"
1 2 3 4 5 6 7 8
Scale

Side and front elevations of House No. 5A41, designed by the Northwestern division of The Architects' Small House Service Bureau of the United States. Copyrighted

Dimensions are taken to outside of foundation walls, to outside of studs on exterior walls and center of studs for partitions.

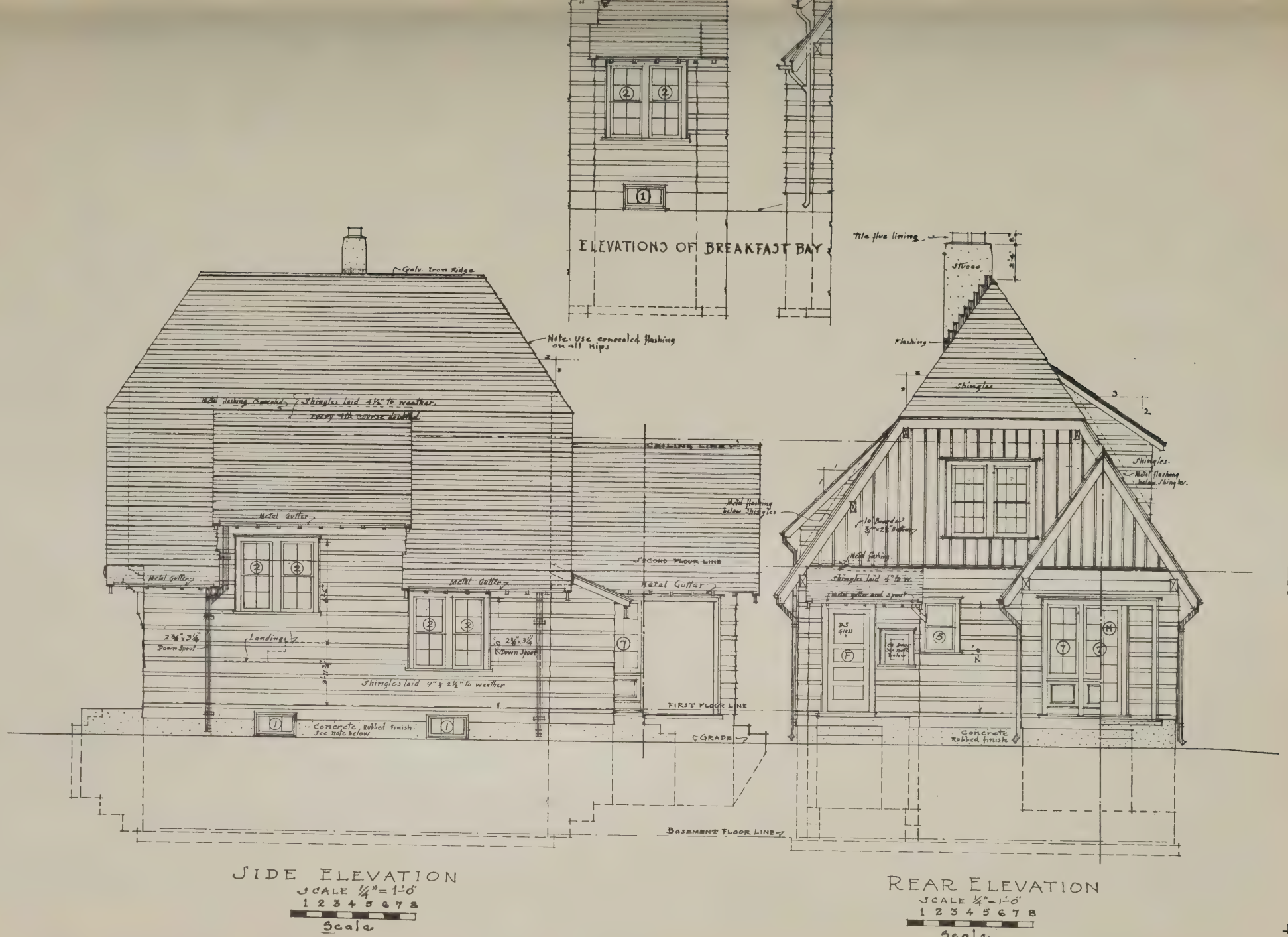
Foundation walls shown concrete may be stone, brick, concrete block, or load-bearing hollow tile.

Where building ordinances permit, foundation walls may be 9 in. thick (with 20x9-in. footings) except in case of stone, which shall be 18 in. thick.

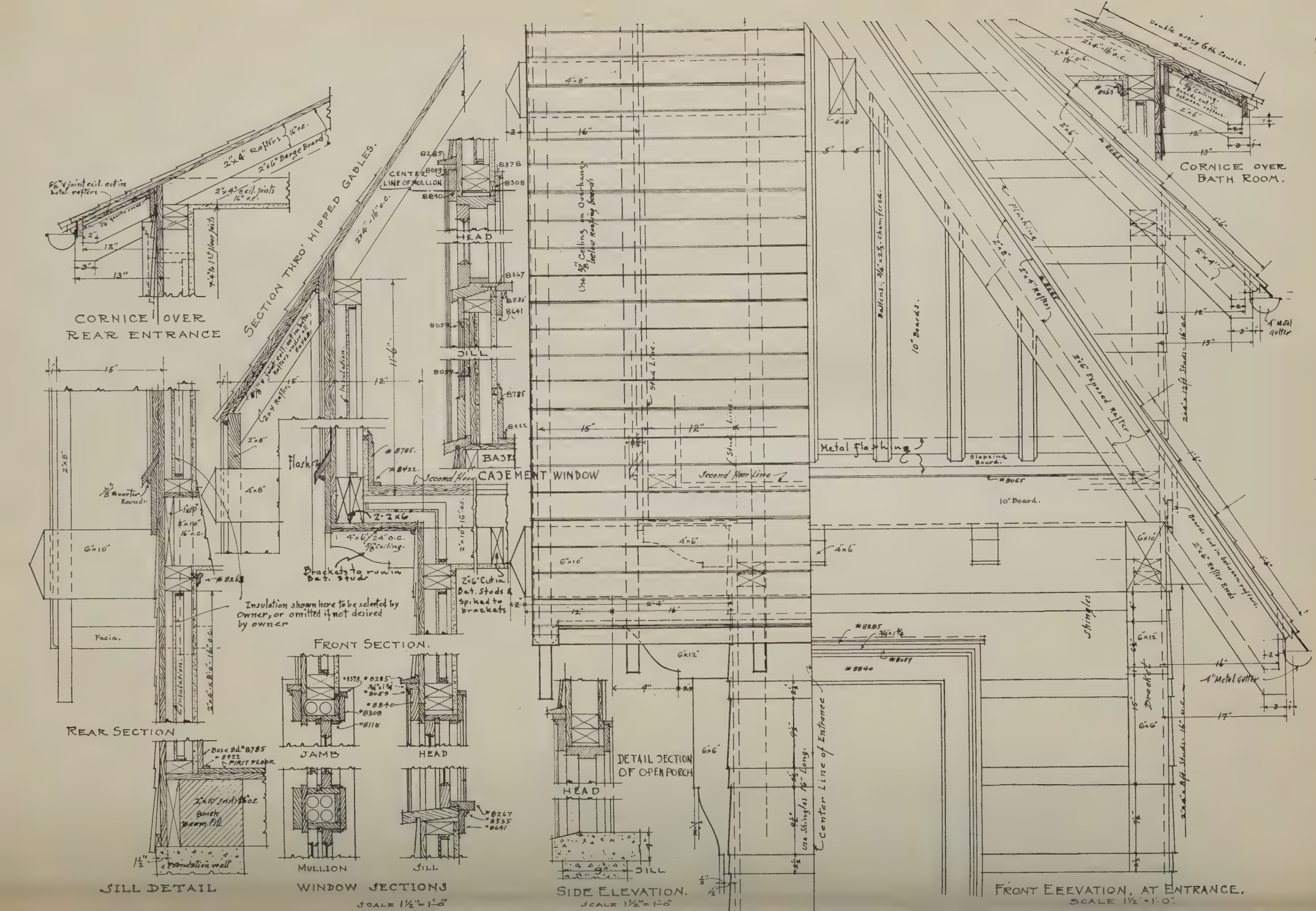
Stock numbers refer to moldings in Universal Millwork Design Book No. 20. In case these moldings cannot be procured, others of similar design and size may be substituted.

Provide 1⅛-in. screen and storm sash for all exterior openings except ice door unless

MATERIALS		ELECTRIC WIRING SYMBOLS			
CONCRETE		CEILING OUTLET		3 WAY SWITCH	
BRICK		DROP CORD		GAS OUTLET	
WOOD		BRACKET		PUSH BUTTON	
PLASTER		BASE PLUG		BELL OUTLET	
		SWITCH		BUZZER	



Side and front elevation of House No. 5A41, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc. Copyrighted by National Builder and The Architects' Small House Service Bureau


CORNICE OVER REAR ENTRANCE
SECTION THRO' HIPPED GABLES.
CENTER LINE OF MULLION
HEAD
SILL
BASE
CASEMENT WINDOW
Second Floor
Second Floor Line
Flashing
Metal flashing
Insulation
Brackets to run in Bet. Stud
2"x6" Cut in Bet. Studs & Spiked to brackets
Insulation shown here to be selected by Owner, or omitted if not desired by owner
Facia.
FRONT SECTION.
REAR SECTION
JAMB
HEAD
MULLION
SILL
SILL DETAIL
WINDOW SECTIONS
SCALE 1½"=1'-0"
DETAIL SECTION OF OPEN PORCH
Center Line of Entrance
Use Shingles 16" long.
SIDE ELEVATION.
SCALE 1½"=1'-0"
Use 5/8" Ceiling on Overhang. Lay Metal Roofing boards
Balcony: ¾"x2½" chamfered.
10" Boards.
Sloping Boards.
10" Board.
Shingles
Double every 6th Course.
CORNICE OVER BATH ROOM.
2"x6" Exposed Rafter
Boards cut in between rafters.
2"x6" Rafter Ends
4" Metal Gutter
FRONT EEVATION, AT ENTRANCE.
SCALE 1½"=1'-0"

Expense Distribution

Describing Various Bases for Correctly Distributing Expenses

By G. W. Hafner

HAVING determined the various constituents of expense as a whole, our next step is to consider the correct application of such expense. The means whereby expense is applied to the various buildings under construction will be fully treated in the next succeeding article. In the meanwhile attention is directed to the proper base for correctly distributing each and every expense to the various departments of the business.

Departmentalization

Each department of a contracting concern is, in effect, a small business, separate and distinct, and should be so treated in the cost-finding arrangement.

The great secret of cost finding lies in departmentalization. Every step in the process of erection must have its own clearly-defined sphere.

Each department has its own expense, has its own particular functions to perform in the building activities, and is, to all intents and purposes, a separate and distinct little business.

Departmentalizing is merely localizing expenses to certain divisions of the business, the various departments being so planned that they represent some distinct division of the whole, which is so different in its operations from other divisions that it merits separate treatment.

Labor

The time of a foreman will be charged directly to the particular department in which he is engaged. In other words, if the entire time of one foreman is given to the excavation department, the total amount of his remuneration will be charged to that department; if, however, both the Excavation and Concrete departments, for instance, are supervised by a single foreman, his time must be distributed to both departments on a basis of the amount of supervision given to each.

The labor of workmen is, of course, charged directly to the particular department or division in which they are employed; as, for instance, concrete workers to the "Concrete" department; carpenters, to the "Carpentry" department, and so on, as illustrated by chart of Expense Classifications (figure 29) illustrated in the preceding article. (November, 1922, page 76.)

In case a workman spends his time in more than one department, the amount of his wages should be distributed to all departments on a basis of the amount of time spent in each.

The wages of superintendents and timekeepers cannot be distributed directly to departments; nor can they always be tied up with a particular building or job. Hence, as will be noted from the "Chart of Expense Classifications" this labor is distributed to "Direct Overhead," where it can be determined as having been used on a specified piece of work, and to "Prorated Overhead" in those cases where it is impossible to analyze it by jobs.

In case such labor can be distributed to particular jobs, the analysis numbers 603 and 604 would be prefixed by a distinguishing letter or number, in order to signify the particular job against which it is to be charged.

Thus, if the contractor is working on three buildings simultaneously, these buildings would be designated by letters or numbers, as "A," "B," "C," or "1," "2," "3," and the distribution of superintendents' and timekeepers' labor to "Direct Overhead" would be shown as A-603, B-603, C-603, A-604, B-604, C-604, or 1-603, 2-603, 3-603, 1-604, 2-604, 3-604.

The time of watchmen and waterboys is distributed to "Direct Overhead," the analysis numbers 605 and 606 being preceded by a distinguishing letter or number as in the case of superintendents and timekeepers.

Maintenance

Repairs to buildings will be distributed to "Prorated Overhead" and to the "Administrative and General Office" department, on a basis of floor space occupied by each.

In other words, repairs to warehouses, garages, stables, or any buildings used for operating purposes, would be distributed to "Prorated Overhead," while repairs to office buildings would go to Administrative and General Office department.

Repairs to machinery and equipment will be distributed to the various departments on a basis of the value of the equipment in each, provided it is not considered advisable to make these charges direct on a basis of the time spent by the firm's workmen and the invoices from outside concerns for work of this character.

Expenses incurred in connection with repairs to wagons and trucks, feed, shoeing, veterinary, gasoline and oil, truck licenses and tires will be charged to "Prorated Overhead" on a basis of purchase invoice rendered by the vendors. If repairs to wagons and trucks are made by the firm's workmen, the time spent on the particular work should be used as the basis for charging the labor, while the materials used should be charged on a basis of purchase invoices.

Supplies—General

Supplies may be distributed to the various departments on a basis of purchase invoices, where such supplies are purchased in limited quantities; the "nature" of the supplies themselves being relied upon to give an approximately correct distribution.

In case a stock of supplies is kept on hand, it is considered advisable to carry supplies as a deferred charge, crediting "Supplies" account in the General Ledger and charging expense with the amount of such supplies used each month.

Where supplies cannot be charged directly to departments, but can be distinguished as having been used on a particular job, distribution would be made to "Direct Overhead," the analysis number preceded by the building letter or number.

In case it is impossible to connect supplies with any given job; or where, as sometimes happens, supplies are purchased for a number of jobs, distribution would be made to "Prorated Overhead."

Insurance

Fire and Tornado insurance on buildings under construction is distributed to "Direct Overhead," the analysis number being preceded by the particular building letter or number; fire and tornado insurance on buildings owned by the concern, to "Prorated Overhead"; liability insurance on buildings under construction, to "Direct Overhead"; while compensation insurance is variously distributed to "Direct Overhead," "Prorated Overhead," and to Administrative and General Office departments on the following bases:

Compensation insurance computed against labor used—the computation being based upon a certain rate or rates per $100 of payroll—is to be charged to "Direct Overhead" in all cases where such labor can be tied up with a particular building. In the case of superintendents and timekeepers, where time is given to a number of jobs, distribution is made to "Prorated Overhead." The expense in connection with carrying compensation insurance for office employes is distributed to Administrative and General Office.

Taxes

The distribution of taxes on real estate is made to "Prorated Overhead" and administrative and General Office department on a basis of floor space utilized by each,

and personal property taxes on machinery and equipment should go to all departments on a basis of value of equipment in each.

Corporate taxes are a direct charge to Office and Administrative department.

Depreciation

Building depreciation is a charge to "Prorated Overhead" and Administrative and General Office department on a basis of the floor space utilized by each; and equipment depreciation to all departments on a basis of the value of equipment in each.

Depreciation of horses, wagons, and trucks is a charge to "Prorated Overhead."

Shed Construction

The material and labor used in erecting temporary sheds on building sites is charged to "Direct Overhead."

Rent

If the building or buildings in which the business is located is rented or leased, instead of being owned, the accrued rental is, of course, a proper charge to expense.

This should be distributed to "Prorated Overhead" and Administrative and General Office on a basis of floor space occupied.

Team and Truck Hire

This expense is chargeable to the various departments, on a basis of invoices rendered by public truckmen.

In those cases where is is impossible to distinguish this expense as applying to specific departments, but where it can be analyzed to particular buildings or jobs, distribution would be made to "Direct Overhead." When it is impossible to distinguish it as applying to any given building, "Prorated Overhead" would be charged.

Executive Salaries

In most cases, this is an "Administrative and General Office" expense, due to the circumstance that the proprietor, manager or other executives give their attention to the general business activity. In some cases, also, the proprietor or manager might give considerable time to the operating end of the business, but it is not considered advisable or necessary that any part of this expense be distributed to "Direct Overhead" or "Prorated Overhead."

Office Salaries

All salaries paid to bookkeepers, clerks, stenographers, or other office employes are charged directly to Office and Administrative department.

Commissions

Administrative and General Office department is charged with the whole of this expense, *as it accrues,* and not as it is paid. For further description as to the manner in which commissions are accrued, see subclassification "Commissions" in the preceding article. (March, 1923, page 54.)

Architect Fees

This expense, when if ever payable, is distributed to "Direct Overhead" or to "Prorated Overhead" depending upon ability to tie up with a given building.

Advertising

This expense is incurred for the sole purpose of acquainting the buying public with the contractor's business, and is, therefore, directly chargeable to the Administrative and General Office department.

Auto Expense

The "Chart of Expense Classifications" shows this expense as a charge against both "Prorated Overhead" and Administrative and General Office department, depending upon whether it is incurred in the General business activities of the concern or is used for operating purposes.

Traveling Expense

Expenses of this character are distributed to "Direct Overhead," "Prorated Overhead" and Administrative and General Office department on the following bases: If incurred in connection with the construction of a specific building, the charge would be distributed to "Direct Overhead"; if in connection with the construction of buildings in general, to "Prorated Overhead"; while if incurred in any other activity of the business, Administrative and General Office department would be charged.

Postage

This is an Office and Administrative department charge.

Telephone and Telegrams

Administrative and General Office department should be charged with total expense.

Stationery, Printing and Office Supplies

All expense of this character should be charged to Administrative and General Office department.

Water, Fuel and Light

These charges are variously distributed to "Direct Overhead," "Prorated Overhead" and Administrative and General Office department, on a basis of use. Where the charge can be analyzed to a specific building, charge "Direct Overhead"; "Indirect Overhead," where applicable to a number of buildings; and Administrative and General Office department where used by the office.

Power

Power purchased for use at buildings is charged to "Direct Overhead."

Collections, Credit and Exchange

This expense is properly chargeable only to Administrative and General Office department.

Legal and Professional Services

Expenses in connection with legal and professional services are a direct charge against Administrative and General Office.

WEEKLY TIME CARD (FIGURE 30)

NAME_____ WEEK ENDING_____

CONTRACT	DESCRIPTION OF WORK	S	M	T	W	T	F	S	HOURS	RATE	AMOUNT

Bad Debts

Administrative and General Office department will be charged with total expense.

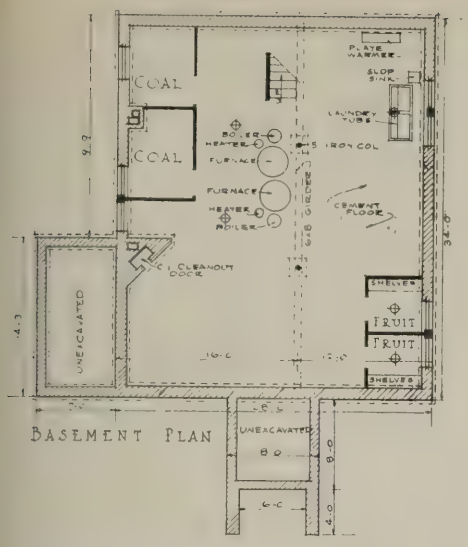
Unclassified

Any expenses incurred in the operation of the business, for which a specific classification has not been provided, will be treated as unclassified, and distributed to all departments of the business by an analysis to determine to what particular department they apply. In this case the nature of the expenses themselves will serve to give a clear idea as to where and for what purpose they were used.

Instruction Regarding "Time" Basis

It will be observed that various references have been made to "Time" as the basis for distributing certain expense to departments.

In such cases, it will always be advisable to obtain the *actual* time spent, which is accomplished by the use of Daily Time Report (Fig. 30).



Basement plan of House No. 252 shown on following page

Two-Family House Designs

HEREWITH are three more designs of typical up-to-date two-family houses, by Henry W. Grieme, architect, Cleveland, Ohio. Other designs were illustrated in the April issue of NATIONAL BUILDER.

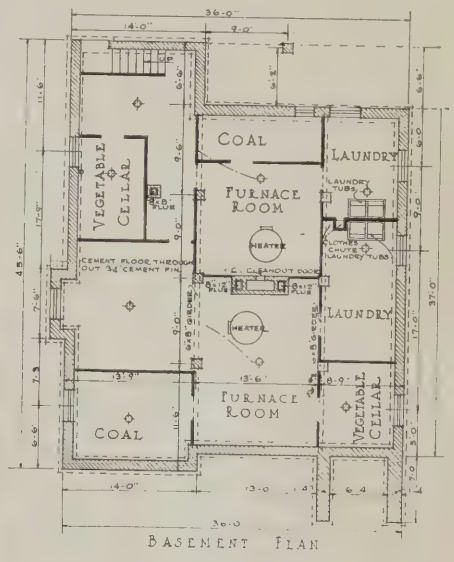
The design of House No. 252 is said to have proved very satisfactory in practice. It has a frontage of 35 ft., though the main body of the house is 28x34 ft. The additional 7 ft. in frontage is obtained by planning a sun room at the side of the living room. The layout is an interesting example of the center entrance two-family house.

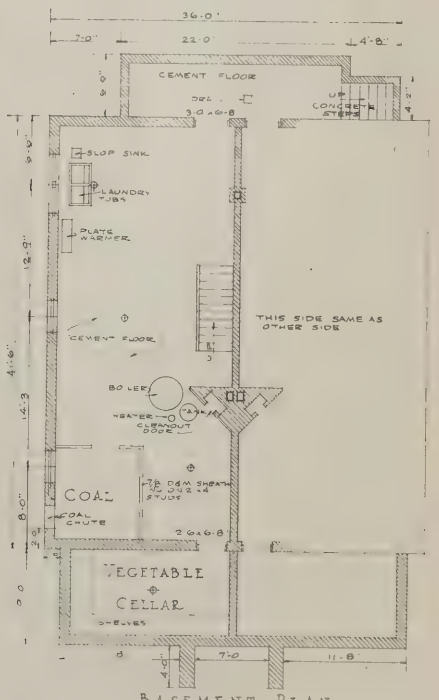
Design No. 205 is an attractive house of stucco and shingle exterior. The rooms are all exceptionally large and provision has been made for an abundance of closet space. The suites consist of living room, dining room, sun room, kitchen, two bed rooms and a bath each. Connecting the dining room and kitchen is an ideal butler's pantry. The sleeping quarters are so arranged as to be completely isolated from the rest of the house.

Design No. 243 is another of the center entrance, up-and-down stairs type, giving the impression of a large single family residence. The large, comfortable living rooms have fireplaces. All the sleeping rooms are on the upper floors, with attractive, open stairways leading from the living rooms. The kitchen has ample cupboard space. This house is believed to be an unusually attractive type of the double house, with exceptionally fine accommodations for two families.

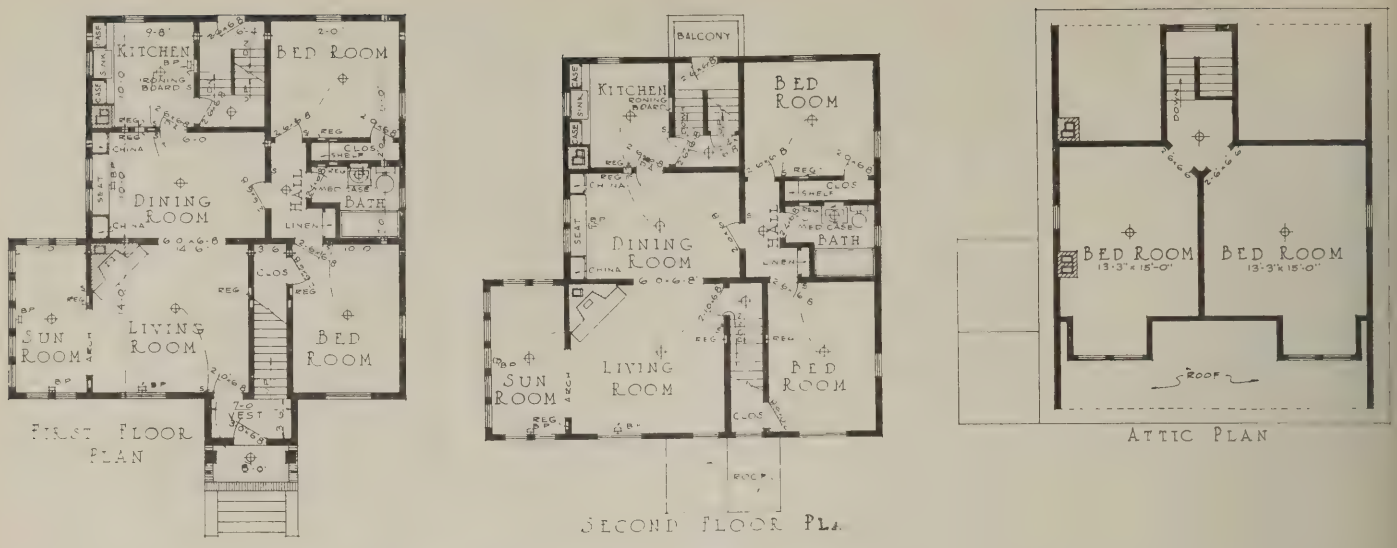
Type of two-family house in Cleveland, Ohio

Another type of two-family house in Cleveland, Ohio

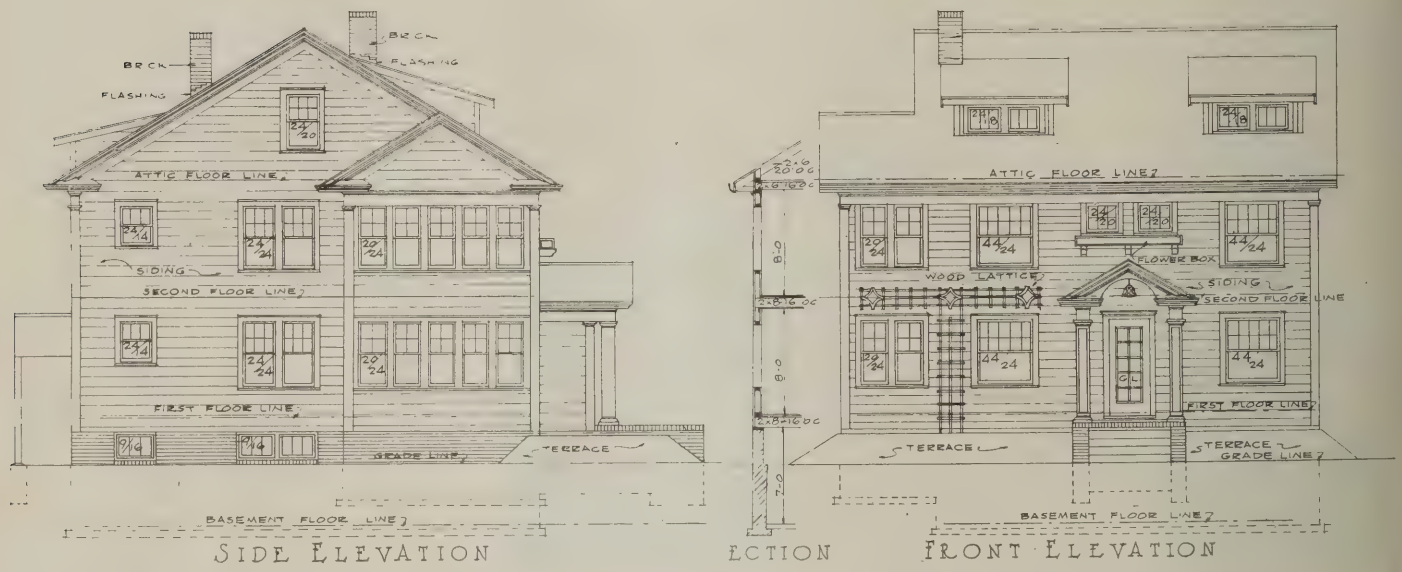




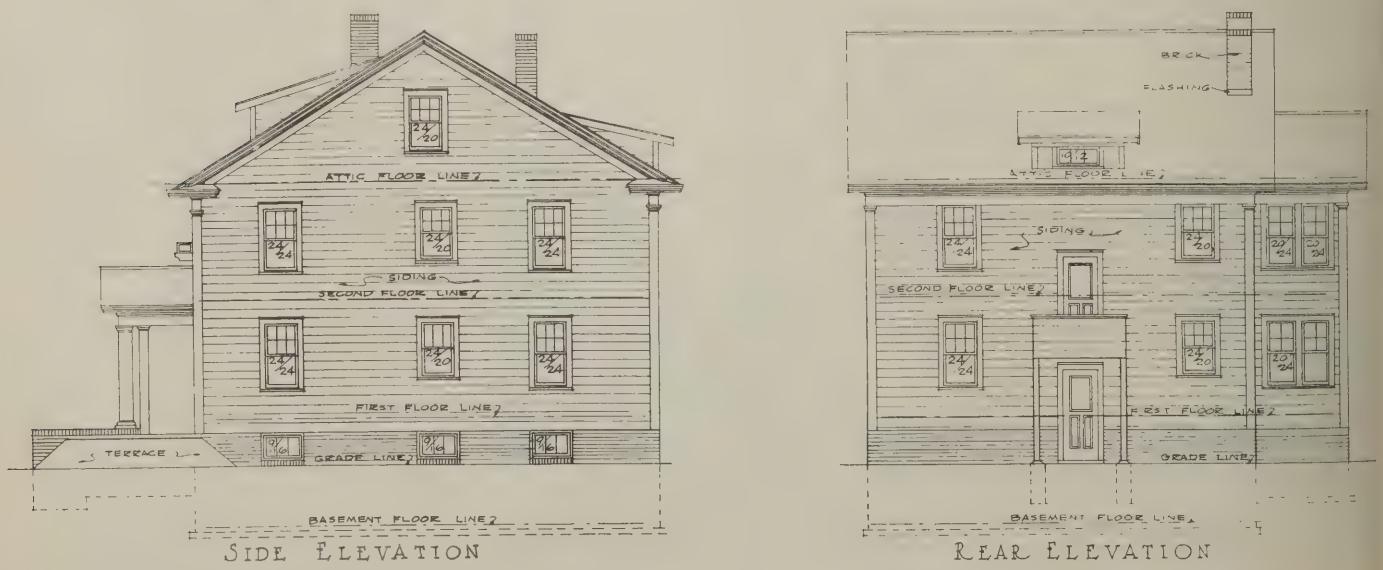
Basement plans of Houses Nos. 205 and 243, shown on succeeding pages



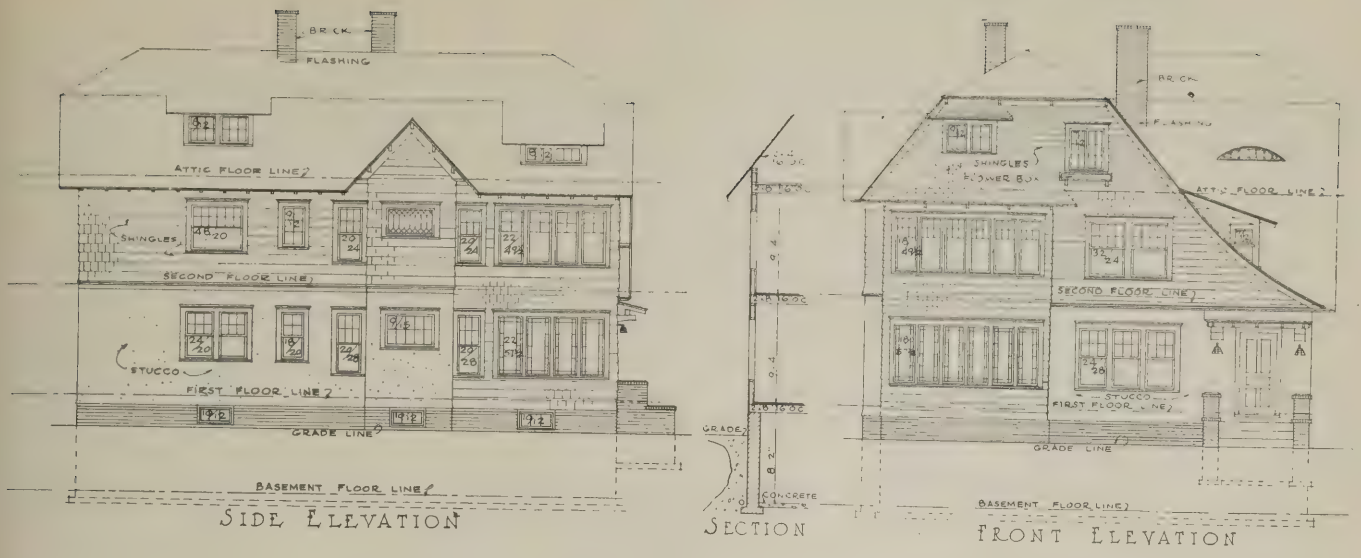
Floor plans of House No. 252, designed by Henry W. Grieme, architect, Cleveland, Ohio



Side and front elevations of House No. 252, designed by Henry W. Grieme, architect, Cleveland, Ohio



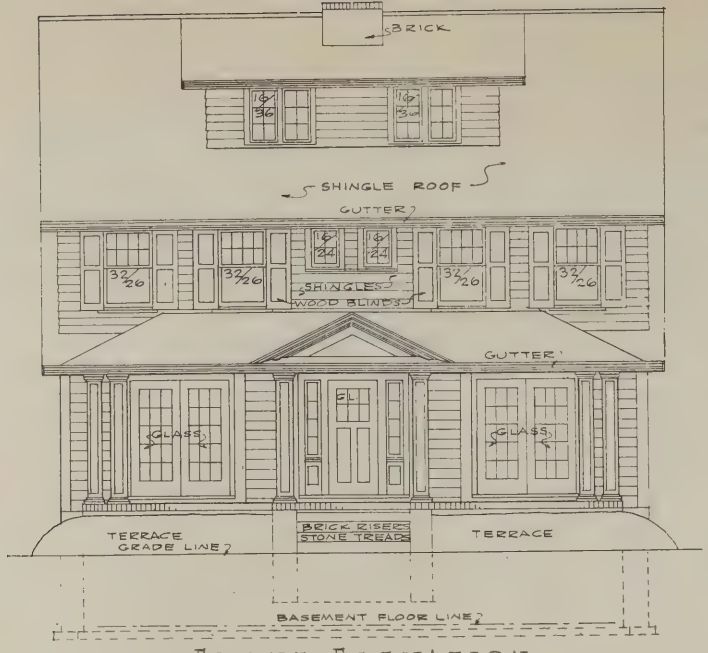
Side and rear elevations of House No. 252, designed by Henry W. Grieme, architect, Cleveland, Ohio



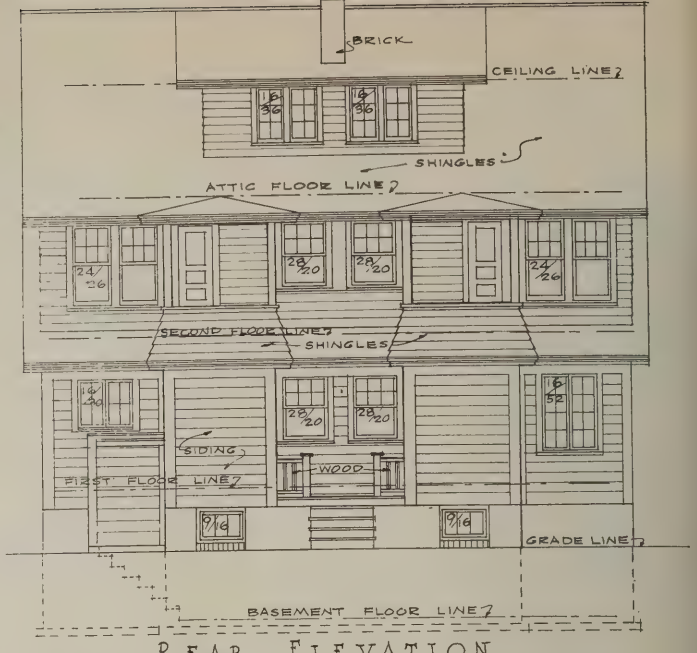
Side and front elevations of House No. 205, designed by Henry W. Grieme, architect, Cleveland, Ohio

Floor plans of House No. 205, designed by Henry W. Grieme, architect, Cleveland, Ohio

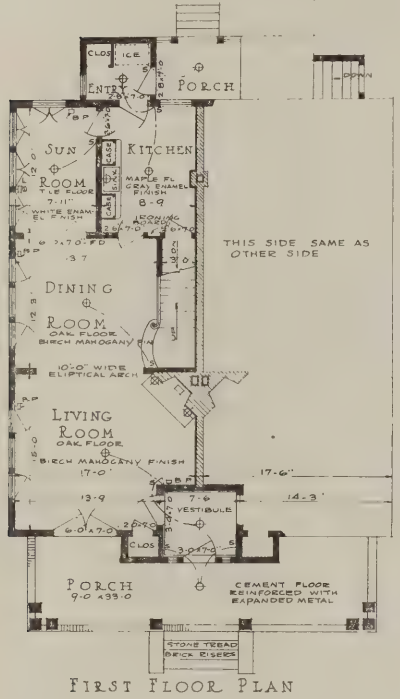
Side and rear elevations of Double House No. 205. Henry W. Grieme, architect, Cleveland, Ohio



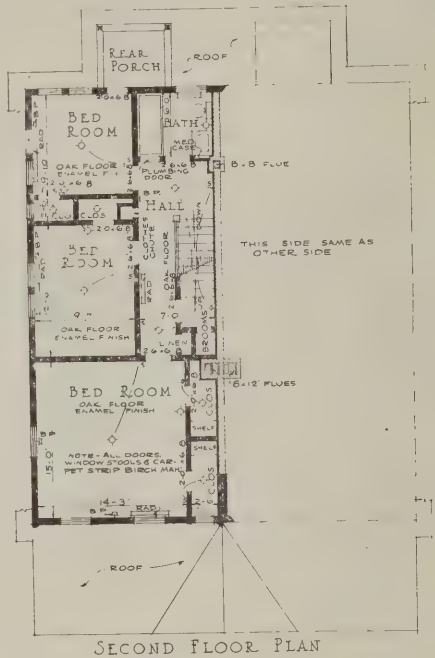
FRONT ELEVATION



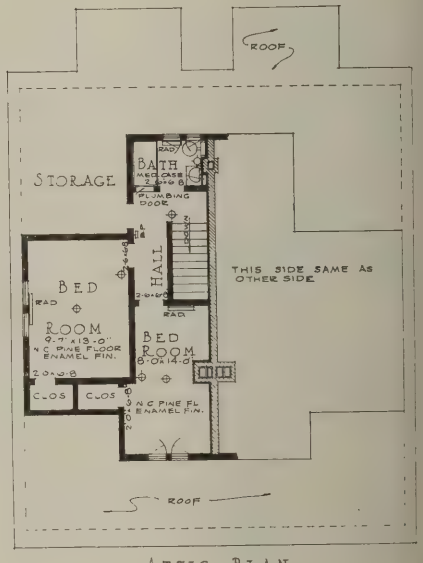
REAR ELEVATION



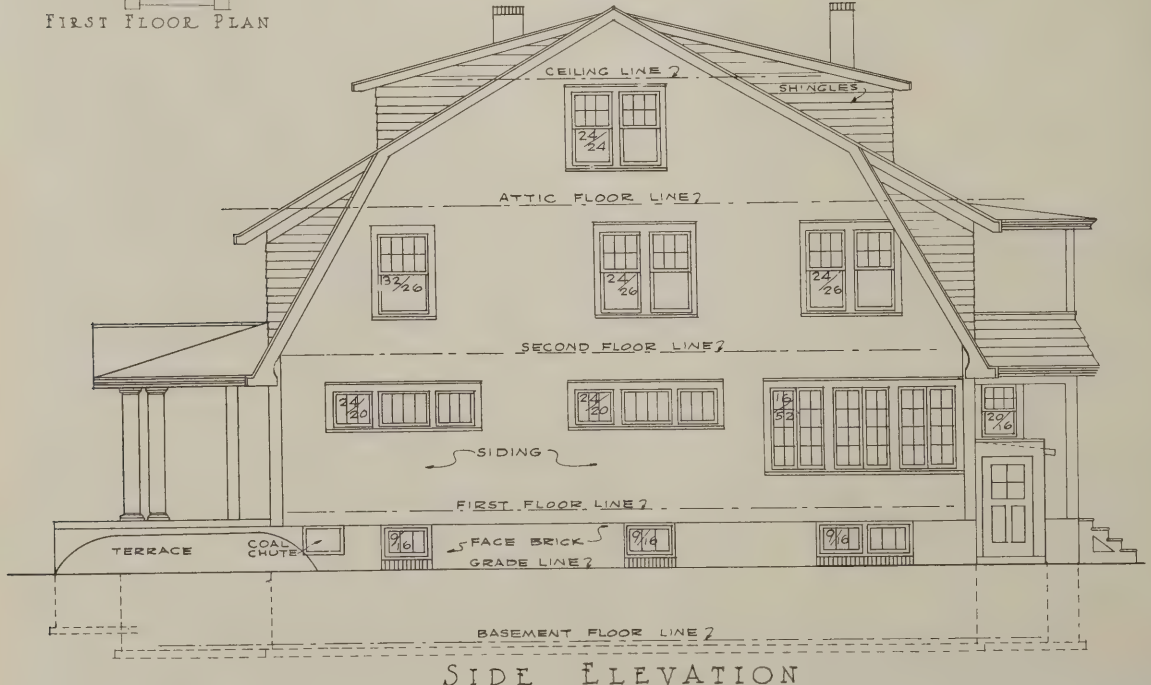
FIRST FLOOR PLAN



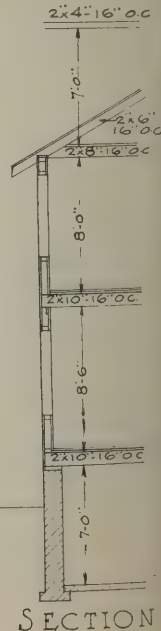
SECOND FLOOR PLAN



ATTIC PLAN



SIDE ELEVATION



SECTION

Plans and elevations of House No. 243. Henry W. Grieme, architect, Cleveland, Ohio

Safe Construction for Built-in Garages

Building Code Committee of the United States Department of Commerce Suggests Specifications

IN a recently issued bulletin of the Department of Commerce, Ira H. Woolson, chairman of the Building Code Committee of the Department of Commerce, and consulting engineer for the National Board of Fire Underwriters' has taken six rules for the construction of built-in garages from "Minimum Requirements for Small Dwelling Construction" (published by the Department of Commerce, Washington, D. C.), and added full instructions for carrying them out.

Mr. Woolson is quoted as follows: "Motorists who keep their cars in built-in garages, or garages attached directly to the side of their dwellings do not run an undue fire risk if they follow certain elementary precautions. If a built-in garage is not properly constructed, it is a menace to life and property. Our investigations showed that if a fire does start in a single or two-car garage, it is not likely to be more severe than would be withstood by the construction classed as affording one-hour fire resistance by the Bureau of Standards of the Commerce Department, the Fire Underwriters' Laboratories, and other authorities. It follows that with an incombustible floor, and the garage separted from the rest of the building by unpierced partitions and ceiling that will meet the one-hour fire test, there is no unreasonable fire hazard. Of course, the outside walls must be fire resistant too, and so must outside windows and the garage doors, in order to prevent flames from breaking out and spreading fire through windows, or to exterior wood work above. The code does permit, under stringent safeguards, a single swinging, self-closing fire door leading from the garage directly into the house, but we strongly advise that there shall be no opening whatever between the two. It is much safer to enter the garage from the outside."

The rules given here are arranged from the "ground up," starting with floor construction, walls, and partitions, then outside doors and windows, and dealing finally, with the permissible case of a door directly between the garage and the dwelling.

Rule 1. Garage floors shall be of concrete or equally fire resistive and impervious material.

For convenience in cleaning and to prevent dangerous accumulations of water, oil or grease, all parts of the floor should drain naturally.

Rule 2. Walls and partitions shall be built to meet the requirements of the standard one-hour fire test (mentioned above).

Many materials are acceptable under this rule, such as brick, hollow tile, concrete block, or gypsum block 4 in. thick, or reinforced concrete 3 in. thick. As a minimum requirement, walls may also be constructed of wooden studs spaced 16 in. center to center, with metal lath attached outside and inside. The outer lath is to be plastered and back-plastered with portland cement stucco, and the inner lath plastered with ¾-in. portland cement or gypsum plaster. For interior partitions separating the garage from the rest of the dwelling, ¾-in. portland cement or gypsum plaster on metal lath, on both sides of studs spaced 16 in. apart, is satisfactory. The specifications for metal lath and plaster to be used are given fully in the Code Committee's Report.

Rule 3. The combined floor and ceiling construction directly above the garage shall be unpierced, and shall have a fire resistance of one hour. The same rule applies to the roof when the garage is attached to the side of the dwelling.

Ceilings or roofs of reinforced concrete, or some other type of incombustible construction that meets the fire test, are best and most reliable. In the case of true built-in garages, a good, inexpensive overhead construction is as follows:

Ordinary 2-in. or thicker floor joists may be used, spaced not more than 16-in. center to center, and properly bridged. The ceiling should be of heavy metal lath weighing not less than 3 lbs. per sq. yd., and portland cement or gypsum plaster not less than ¾ in. thick. The metal lath is to be attached to the joists by sixpenny nails driven nearly home and the heads turned over against the lath, and is to be bent down 6 in. along the walls on all sides and securely attached to them. The flooring above the ceiling is to be double, or ⅞ in. rough and finished floor boards, with a layer of asbestos or other high-grade floor felt between.

Where the garage is attached to the side of a dwelling, an equivalent construction for the roof can easily be devised.

Rule 4. When a garage is located beneath a dwelling, all outside doors and windows with the frames and sash shall be of standard fireproof construction, and glazed with wired glass.

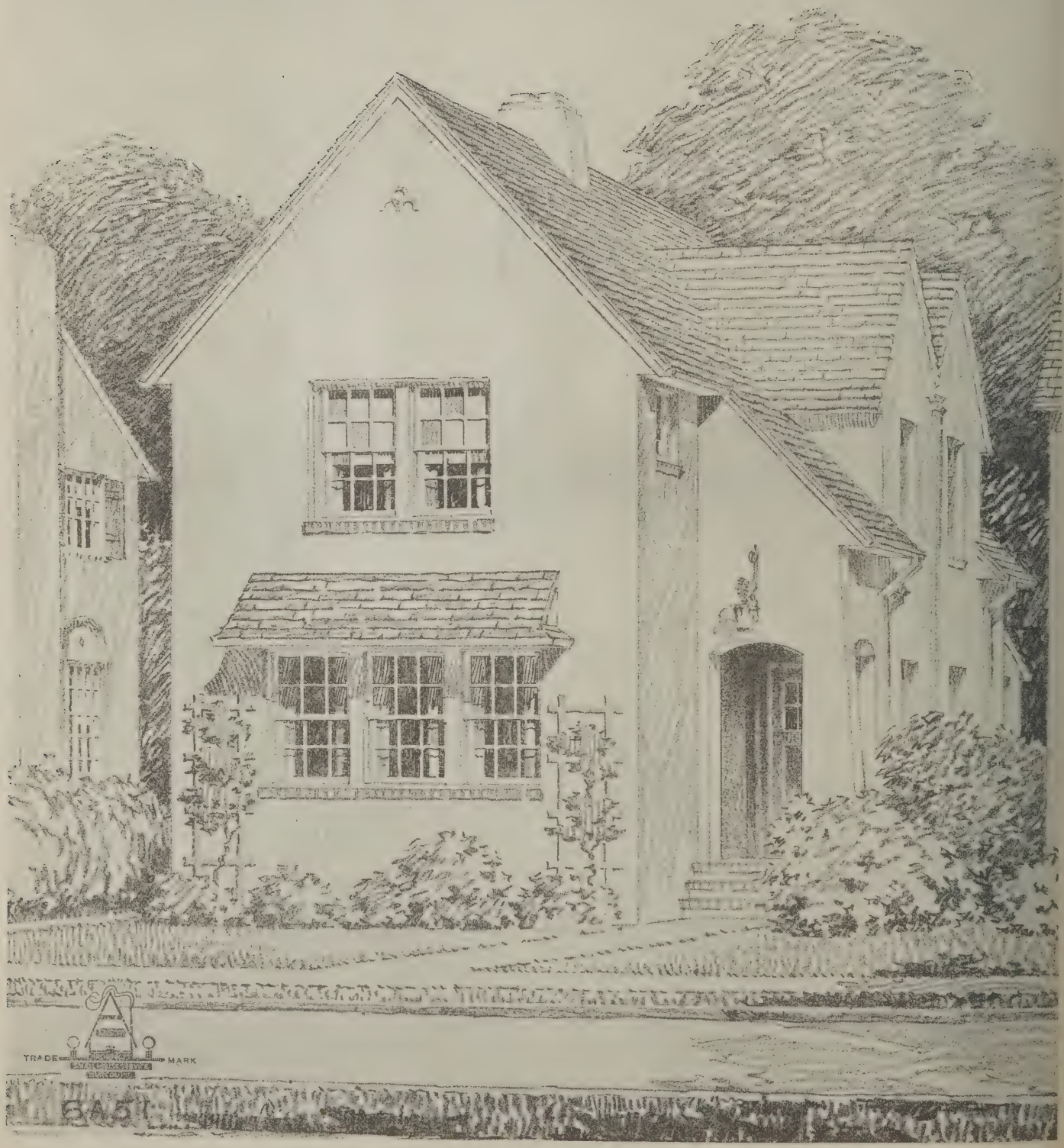
Only products approved by competent authorities should be used. A large variety of fire doors and windows have been tested and approved by the Underwriters' Laboratories, and are a standard commodity in the building material market. It is important that such devices should be installed in metal frames, and that the same hardware be used as that with which they were equipped when tested. If not, they may fail during a fire. Fire doors are made in both swinging and sliding types, and many of the former are as artistic as wooden doors. Wired glass glazing is required in all outside windows and doors to prevent flames from a fire in the garage from breaking through and endangering the structure or windows above.

Rule 5. Openings from a dwelling into a garage shall be restricted to a single doorway. This opening shall be protected by a standard swinging, self-closing fire door, with approved fire resistive frame and hardware. No glass shall be permitted in such a door.

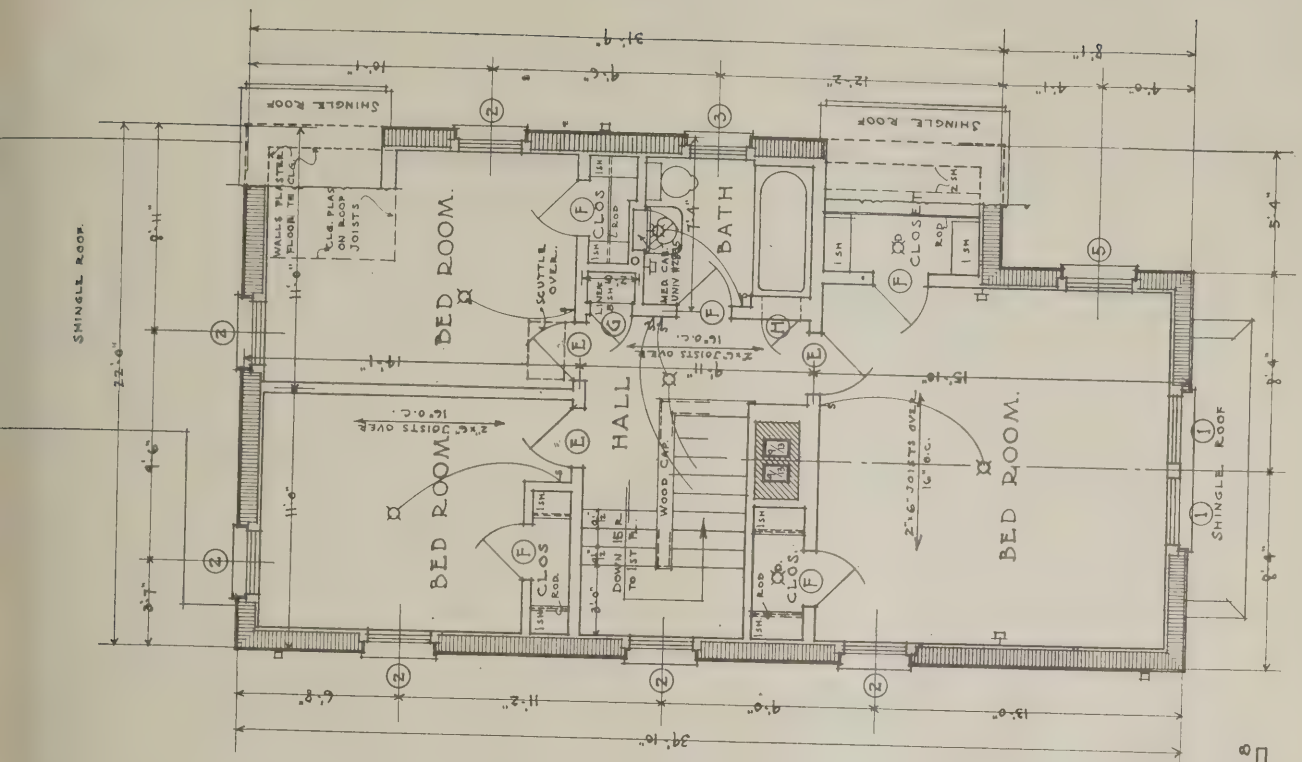
A self-closing fire door is one that normally swings shut by mechanical device. A swinging door is required because it fits closely into its frame, and thereby prevents passage of heat and smoke when attacked by fire. Wired glass is not allowed in this door because it is liable to soften and sag from its fastenings at a temperature of about 1600 deg. Fahrenheit, which is a heat easily produced by burning gasoline or oil. But, as stated above, it is better to have no opening in any of the partitions.

Rule 6. When a doorway connects directly with a cellar or basement on the same or lower level in which there is any heating device or gas fixture, the door sill shall be raised at least one foot above the garage floor level, or the doorway shall lead into a vestibule which connects with the cellar or basement by a second door.

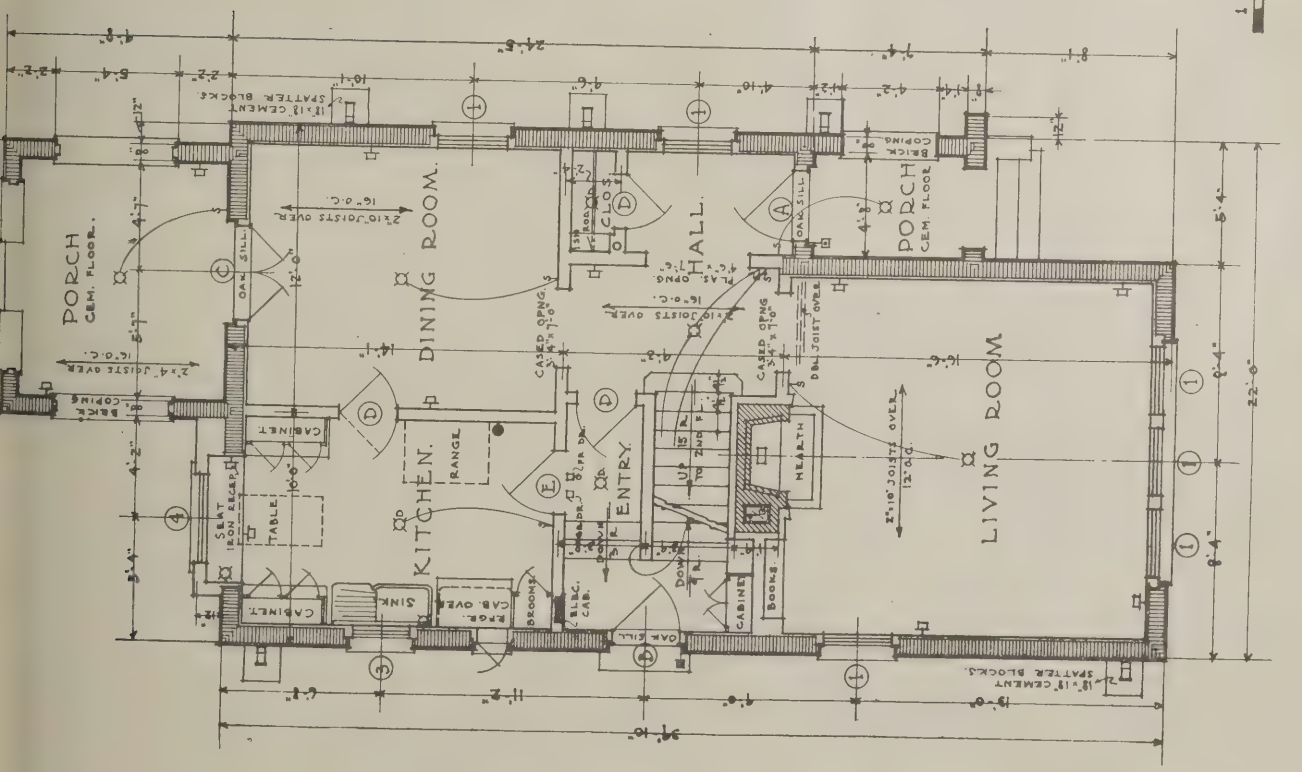
This is to prevent fumes from gasoline which may leak or be spilled upon the floor from reaching a furnace fire or gas light that might be located in any lower portion of the building. It is well known that gasoline vapors are heavier than air, and will accumulate on a floor like water, and flow to any lower level, and if they come in contact with fire of any kind—even a spark—will ignite and flash back to the starting point, and cause an explosion. Hence the high door sill.



House No. 6A51, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc. Copyrighted by National Builder and The Architects' Small House Service Bureau



SECOND FLOOR PLAN.



FIRST FLOOR PLAN.

SCALE 1/4" = 1'-0"

Floor plans of House No. 6A51, designed by the Northwestern division of The Architects' Small House Service Bureau of the United States. *Copyrighted*

Two-Story Domestic Type House No. 6A51

Designed Especially for National Builder by the Northwestern Division of the Architects' Small House Service Bureau

THIS house has been especially designed for a narrow lot. It is only 22 ft. wide so it will go on a 30-ft. lot. The exterior walls are of clay or concrete tile covered with stucco. The narrow breadth and masonry exterior walls make this house especially suitable for location in a city.

The plans call for living room, dining room, kitchen and hallway on the first floor, with a large porch at the rear, and for three commodious bedrooms and bath on the second floor. If it is desired to put a sleeping porch above the first story porch, this can be done quite readily.

One enters the house through a covered porchway into a large hall in which there is a coat closet. The living room is 15 ft. square and is made interesting with a generous fireplace with bookcases at one side. A window quite 10 ft. wide at the end of the living room opposite the hearth gives character to this room. The grade entrance at the side leads to the basement or to the kitchen. The kitchen is designed scientifically to save steps. There is a bay window in this room with a built-in seat to serve as a dining alcove.

In the second story each bedroom is equipped with a closet, and there is in addition a linen closet in the hallway. A complete basement has been planned with space for the storage of fuel, furnace room and a large well lighted laundry.

The house is designed to face west or south. Reversed plans for other facings are furnished without extra charge.

The regular price for this plan is $30.50. ($15.50 to NATIONAL BUILDER subscribers.)

EXCAVATING—200 cu. yd.

BACKFILLING—43 cu. yd.

FOUNDATION—If 12" concrete, 49 cu. yd. gravel, 198 sax cement; if 9" concrete, 40 cu. yd. gravel, 162 sax cement; if 12" tile, 23760 CBM tile, 18 cu. yd. mortar; if 9" tile, 19000 CBM tile, 15 cu. yd. mortar; 600 face brick, ½ cu. yd. mortar; 1 tile inserts (see sketch).

CEMENT FLOOR—6 cu. yd. gravel; 5 cu. yd. sand; 67 sax cement; 5 cement spatter blocks; 24 lin. ft. cement steps.

CHIMNEY—3000 common brick; 100 fire brick; 20 sq. ft. hearth tile; 160 inside face brick; — lin. ft. 8x12 flue tile; 20 lb. fire clay; 3 cu. yd. mortar; 1 cast-iron ash dump; 1 throat and damper; 1 angle 4x3x5/16-4'0; 2—10x8 cleanouts; 3 adjustable thimbles; 4 yd. metal lath.

LATH—9 sq. yd. metal lath; 6580 wood lath; add for outside walls, if lathed, 3000 lath.

PLASTER—9 sq. yd. plaster on metal lath; 240 sq. yd. plaster on tile walls; 470 sq. yd. plaster on wood lath; 14 sq. yd. Keene's cement; 324 sq. yd. stucco on tile.

TILE FLOORS—26 sq. ft. ceramic tile; 22 lin. ft. cove base.

TILE WALLS—25500 CBM tile; 19 cu. yd. mortar.

LUMBER—4—6x6-7 posts; 1—6x8-22 girders; 1—6x8-7 girder; 4—2x4-14 stair horses; 8 ft. 2" plank cleanout cover; 18—2x10-14 first-floor joist; 18—2x10-11 first-floor joist; 15—2x10-16 first-floor joist; 120 lin. ft. 1x4 bridging; 4—2x10-16 headers; 2—2x10-14 doubles under partitions; 1—2x10-11 doubles under partitions; 800 ft. com. bds. first-floor subfloor; 1080 ft. 13/16x1½ first-floor finish floor; 195 lin. ft. 2x4 first-floor partition plates; 78—2x4-9 first-floor partition studs; 3—2x10-16 stair horses; 18—2x10-14 second-floor joist; 18—2x10-12 second-floor joist; 15—2x10-16 second-floor joist; 3—2x10-14 second-floor joist headers; 1—2x10-14 doubles under partitions; 1—2x10-12 doubles under partitions; 288 lin. ft. 2x4 second-floor partition plates; 84—2x4-8 second-floor partition studs; 8—2x4-6 porch ceiling joist; 2—2x6-5 porch girders; 2—2x6-8 porch girders; 10—2x4-10 porch ceiling joist; 4—2x8-10 porch girders; 2—2x8-12 porch girders; 18—2x6-14 second-floor ceiling joist; 18—2x6-12 second-floor ceiling joist; 15—2x6-16 second-floor ceiling joist; 800 ft. com. bds. second-floor subfloor; 1020 ft. 13/16x1½ second-floor finish floor; 2—2x6-16 ceiling joist headers; 170 ft. ⅝x4 ceiling porch; 10—2x4-12 rafters, porch; 14—2x6-22 rafters; 70—2x6-14 rafters; 28—2x6-10 rafters; 25—2x6-16 lookouts; 1100 lin. ft. grounds; 11—1x6-10 collar ties; 900 ft. D & M attic flooring; 4—2x4-16 projection roof rafters; 1980 ft. com. bds. roof sheathing; 14½ M shingles; 62 lin. ft. 1x8 ridge rafters; 124 lin. ft. ridge boards; 10—2x6-18 headers and scaffold; 20—2x4-16 headers and scaffold; 8—2x4-14 headers and scaffold; 3—2x8-16 headers and scaffold; 5—2x10-20 headers and scaffold; 4—2x12-16 headers and scaffold; 150 ft. siding; 460 ft. shiplap sheathing; 10—2x4-14 dormer studs; 124—1x2-18 wall stripping; 124 lin. ft. 2x8 wall plates; 720 lin. ft. 1x2 ceiling strips.

MILLWORK—Frames: 3 single 10x12-12L-1⅜; 1 mullion 10x12-12L-1⅜; 1 triple 10x12-12L-1⅜; 6 single 9x12-12L-1⅜; 2 single 8x10-12L-1⅜; 1 single 10x12-16L-1⅜; 1 sash 10x12-6L-1¾; 5 sash 7x9-3L-1¾; 1 mul. sh. fr. 7x9-3L-1¾; 1 window fr. 10x16-4L-1⅜. **Windows:** 8—10x12-12L-1⅜; 6—9x12-12L-1⅜; 2—8x10-12L-1⅜; 1—10x12-16L-1⅜; 1 sh. 10x12-6L-1¾; 7 sh. 7x9-3L-1¾; 1 window 10x16-4L-1⅜. **Storm Sash:** 8—10x12-12L-1⅜; 6—9x12-12L-1⅜; 2—8x10-12L-1⅜; 1—10x12-16L-1⅜; 1—10x12-6L-1⅜; 7—7x9-3L-1⅜; 1—10x16-4L-1⅜. **Screens:** 8—10x12-12L-1⅜; 6—9x12-12L-1⅜; 2—8x10-12L-1⅜; 1—10x12-16L-1⅜; 1—10x12-6L-1⅜; 7—7x9-3L-1⅜; 1—10x16-4L-1⅜. **Outside Door Frames:** 1—3'0x7'0-1¾; 1—2'10x6'8-1¾; 1 opening 4'0x7'0-1⅜; 1 icing dr. fr. **Outside Doors:** 1—3'0x7'0-1¾ (No. 1246); 1—2'10x6'8-1¾ (No. 912); 2—2'0x7'0-1⅜ (No. 1600-10L); 1 icing dr.; 1 astragal for 7'0 doors-1⅜. **Storm Doors:** 1—3'0x7'0-1⅛; 1—2'10x6'8-1⅛; 1 pr. opening 4'0x7'0-1⅛. **Screen Doors:** 1—3'0x7'0-1⅛; 1 2'10x6'8-1⅛; 1 pr. opening 4'0x7'0-1⅛. **Outside Millwork:** 228 lin. ft. cornice; 70 lin. ft. ceiling cove; 2 porch opening fr. 5'0x5'6; 1 porch opening fr. 8'0x5'6. **Interior Doors:** 3—2'6x7'0-1⅜ (No. 1103); 4—2'8x6'8-1⅜ (No. 1103); 5—2'4x6'8-1⅜ (No. 1103); 1—1'10x6'8-1⅜ (No. 1103); 1—2'0x3'0-1⅜, 1 p.; 1—2'6x6'6-1⅜ (No. 1105). **Jambs:** 3—2'6x7'0; 4—2'8x6'8; 5—2'4x6'8; 1—1'10x6'8; 1—2'0x3'0; 1—2'6x6'6; 2—3'4x7'0. **Interior Trim:** 3 sides single 10x12-12L; 1 side mul. 10x12-12L; 1 side triple 10x12-12L; 6 side single 9x12-12L; 2 sides single 8x10-12L; 1 side single 10x12-16L; 1 side single 10x12-6L; 5 sides single 7x9-3L; 1 side mul. 7x9-3L; 1 side single 10x16-4L; 1 side door 3'0x7'0; 1 side door 2'10x6'8; 1 side double door 4'0x7'0; 1 side icing door; 6 side door 2'6x7'0; 8 side door 2'8x6'8; 10 side door 2'4x6'8; 2 side door 1'10x6'8; 1 side door 2'0x3'0; 2 side door 2'6x6'6; 4 side opening 3'4x7'0; 1 flight basement stair with rail; 1 flight grade stair; 1 flight main stairs with rail; 1 medicine cabinet No. 2835; 1 scuttle door; 1 scuttle door jamb; 1 scuttle door side trim; 1 mantel shelf; 1—4'0 bookcase; 1—2'6 cabinet; 1 electric cabinet; 1—5'0 broom and refrigerator cabinet; 2—4'0 kitchen cabinets; 1—5'6 kitchen seat; 1 breakfast table; 20 lin. ft. closet shelving; 20 lin. ft. closet hook strip; 20 lin. ft. closet clothes rod; 550 lin. ft. base; 550 lin. ft. base shoe; 550 lin. ft. base molding; 122 lin. ft. ceiling cove; 300 lin. ft. picture molding; 30 lin. ft. band molding; 12 lin. ft. threshold. **Note:** If living and dining room and hall trim is changed, it will affect the following: 1 door 3'0x7'0-1¾ (No. 1246); 1 side trim 3'0x7'0; 3 doors 2'6x7'0-1⅜ (No. 1103); 2 jambs 2'6x7'0; 3 side trim 2'6x7'0; 2 jambs 3'4x7'0; 4 side trim 3'4x7'0; 2 door 2'0x7'0-1⅜ (No. 1600); 1 side trim 4'0x7'8; 3 sides single wd. trim 10x12-12L; 1 side triple wd. trim 10x12-12L; 1—4'0 bookcase; 1 mantel shelf; 1 main stair with rail; 122 lin. ft. ceiling cove; 174 lin. ft. picture molding; 160 lin. ft. base; 160 lin. ft. base shoe; 160 lin. ft. base molding; 740 ft. 13/16x1½ finish flooring.

TINWORK—36 lin. ft. valley tin; 40 lin. ft. flashing tin; 12 lin. ft. chimney flashing; 90 lin. ft. gutter; 24 gutter hangers; 10 gutter ends; 6 nipples; 6 strainers; 6 elbows; 6 offsets; 6 shutoffs; 96 lin. ft. conductor; 15 conductor hooks; 350 tin shingles.

INSULATION—3 rolls felt for floors; 1 roll felt for walls; 4 rolls felt for roof; 750 ft. ½-in. flaxlinum or equal for second-floor ceiling.

WEATHER STRIPPING—8 windows 10x12-12L; 6 windows 9x12-12L; 2 windows 8x10-12L; 1 window 10x12-16L; 1 sh. 10x12-6L; 7 sh. 7x9-3L; 1 wd. 10x16-4L; 1 dr. 3'0x7'0; 1 dr. 2'10x6'8; 2 dr. opng. 4'0x7'0; 1 icing door.

CAULKING—19 single frames; 2 mullion frames; 1 triple frame; 2 single door frames; 1 double door frame; 1 icing door frame; 1 coal chute.

HARDWARE—7 cellar sash sets; 18 sash locks; 18 sash lifts; 26 storm sash set; 26 screen sash sets; 1 front door set with butt; 1 side door set with butts; 1 double door set with butts; 1 icing door set with butts; 2 single storm door sets; 1 double storm door set; 2 single screen door sets; 1 double screen door set; 1 floor hinge; 2 push plates; 14 inside door sets with butts; 19 door bumpers; 4 dozen clothes hooks; 600 lb. assorted nails; 5 lb. assorted brads; 450 lb. sash weights; 4 hanks sash cord; 1 coal chute; (medicine cabinet: 1 pr. ornamental butts, 1 cupboard turn); (broom closet: 4 pr. ornamental butts, 3 cupboard turns, 1 elbow catch); (kitchen cabinet: 1 set castors, 1 bin pull, 6 drawer pulls, 2 pr. ornamental butts, 1 elbow catch, 1 cupboard turn); (kitchen cabinet: 2 drawer pulls, 4 pr. ornamental butts, 2 cupboard turns, 2 elbow catches); 4 friction stays, utility door; 1 pr. hinges for seat cover; 1 pr. hinges for scuttle door; (meter cabinet: 1 pr. ornamental butts, 1 cupboard turn); 2 brackets for table.

REINFORCING STEEL—15—⅜ rods-11'0; 17—⅜ rods-9'0; 8—⅜ rods-9'0; 11—⅜ rods-5'0.

LINTELS—3 for single frames 10x12-12L; 1 for mul. frame 10x12-12L; 1 for triple frame 10x12-12L; 6 for single frames 9x12-12L; 2 for single frame 8x10-12L; 1 for single frame 10x12-16L; 1 for single frame 10x12-6L; 5 for single frame 7x9-3L; 1 for mullion frame 7x9-3L; 1 for single frame 10x16-4L; 1 for 3'0 door opening; 1 for 2'10 door opening; 1 for 4'0 door opening; 1 for icing door opening; 2 for single opening 5'4; 1 for single opening 8'2.

STRUCTURAL IRON, ETC.—31 bolts ½ in., 20 in. with nuts and washers; 24 joist anchors.

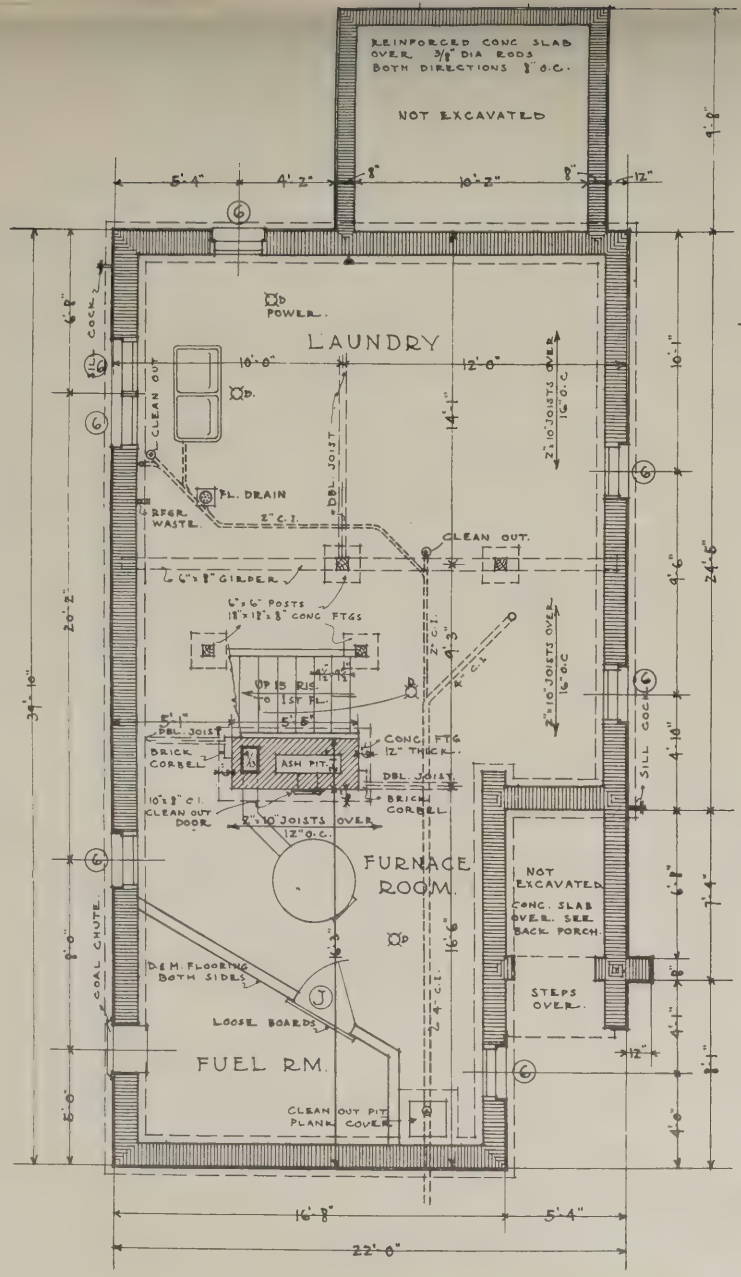
EXTERIOR PAINTING—5 gal. trim paint; 2 gal. body paint; 1 gal. boiled oil; 43 gal. shingle stain; 1 gal. screen paint; 1 gal. sash paint; ¼ gal. shellac; 1 gal. japan; 10 lb. putty; 6 doz. sheets sandpaper.

INTERIOR PAINTING—12 gal. white paint; 7 gal. enamel; 5 gal. filler stain; 3 gal. shellac; 11 gal. interior varnish; 3 gal. floor shellac; 6 gal. floor varnish; 2 gal. oil; 1 gal. japan; 1 gal. turpentine; 1 gal. alcohol; 3 lb. steel wool.

QUANTY	TYPE	DESCRIPTION	NO OF LIGHTS	SIZE OF GLASS	SIZE OF OPNG FOR SASH	THICK SASH	FRAME
8	1	DBL. HUNG	12	10x12	2'-10½" x 4'-6"	1⅜"	SEE DETAILS
6	2	"	12	9x12	2'-7⅛" x 4'-6"	"	"
2	3	"	12	8x10	2'-4½" x 3'-10"	"	"
1	4	"	16	10x12	3'-8⅜" x 4'-6"	"	"
1	5	SASH	6	10x12	2'-10" x 2'-5"	1¾"	"
7	6	"	3	7x9	2'-1" x 1'-2"	"	"
1	7	DBL HUNG	4	10x16	2'-1" x 3'-2"	1⅜"	"

SCHEDULE OF DOORS.

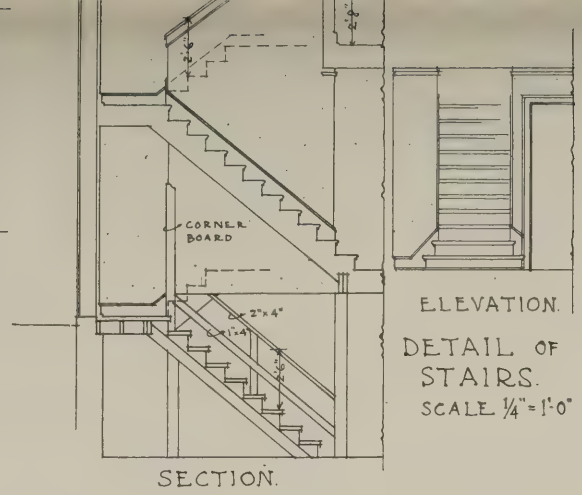
QUANTY	TYPE	SIZE	DESCRIPTION	REMARKS
1	A	3'-0" x 7'-0" x 1¾"	#1246 OAK	6 LTS PL. GL.
1	B	2'-10" x 6'-8" x 1¾"	#912 PINE	6 LTS. D.S. GL.
1	C	TWO EACH 2'-0" x 7'-0" x 1⅜"	#1600 PINE.	10 LTS D.S. GL.
3	D	2'-6" x 7'-0" x 1⅜"	#1103 BIRCH	
4	E	2'-8" x 6'-8" x 1⅜"	" "	
5	F	2'-4" x 6'-8" x 1⅜"	" "	
1	G	1'-10" x 6'-8" x 1⅜"	" "	
1	H	2'-0" x 3'-0" x 1⅜"	ONE PANEL BIRCH.	ACCESS DOOR
1	J	2'-6" x 6'-6" x 1⅜"	#1105 PINE.	



BASEMENT PLAN.

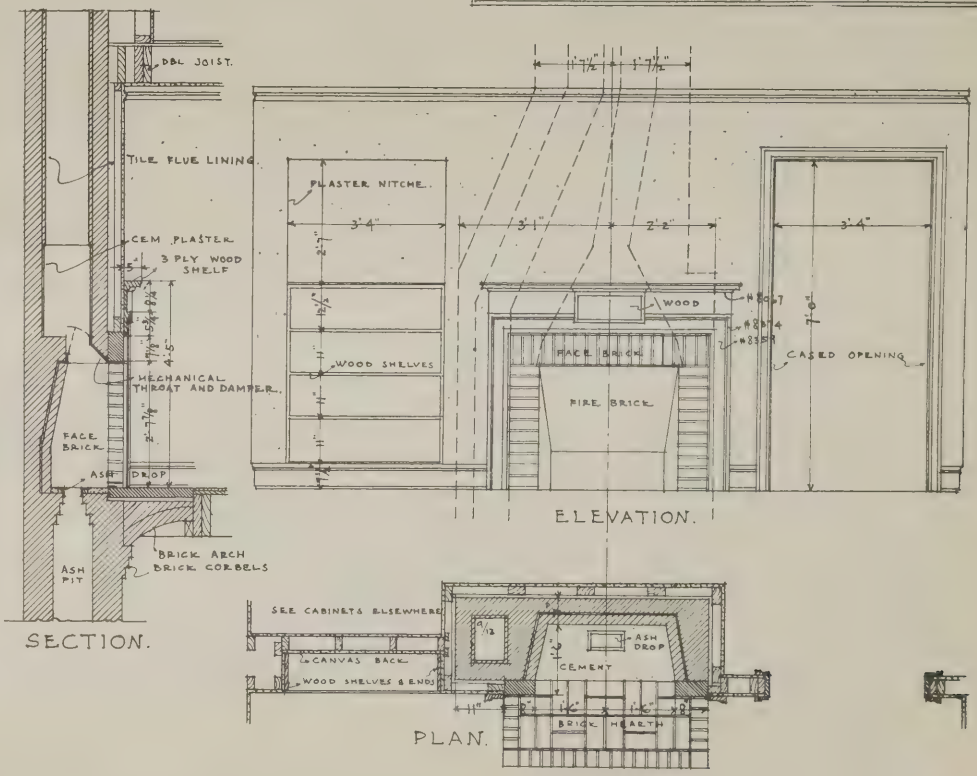
SCALE ¼" = 1'-0"

1 2 3 4 5 6 7 8



DETAIL OF STAIRS.

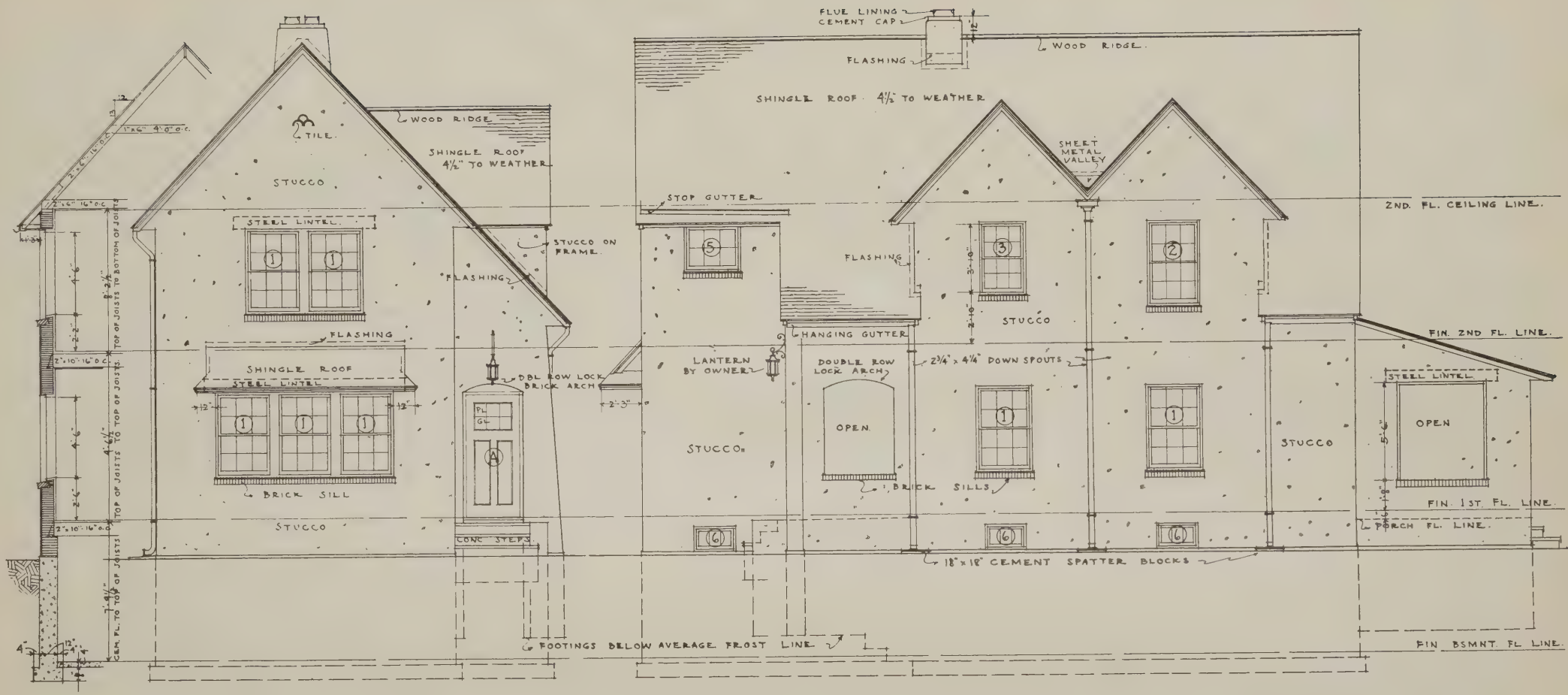
SCALE ¼" = 1'-0"



DETAILS OF FIREPLACE

SCALE ½" = 1'-0"

Basement and foundation plan of House No. 6A51, designed by the Northwestern division of The Architects' Small House Service Bureau of the United States. Copyrighted



SECTION. FRONT ELEVATION. SIDE ELEVATION.

1 2 3 4 5 6 7 8
Scale

SCALE ¼" = 1'-0"

1 2 3 4 5 6 7 8
Scale

Front and side elevation of House No. 6A51, designed by the Northwestern division of The Architects' Small House Service Bureau of the United States. Copyrighted

The chart below shows the symbols used on all the plans of The Architects' Small House Service Bureau of the United States, Inc.

Dimensions are taken to outside of foundation walls, to outside of studs on exterior walls and center of studs for partitions.

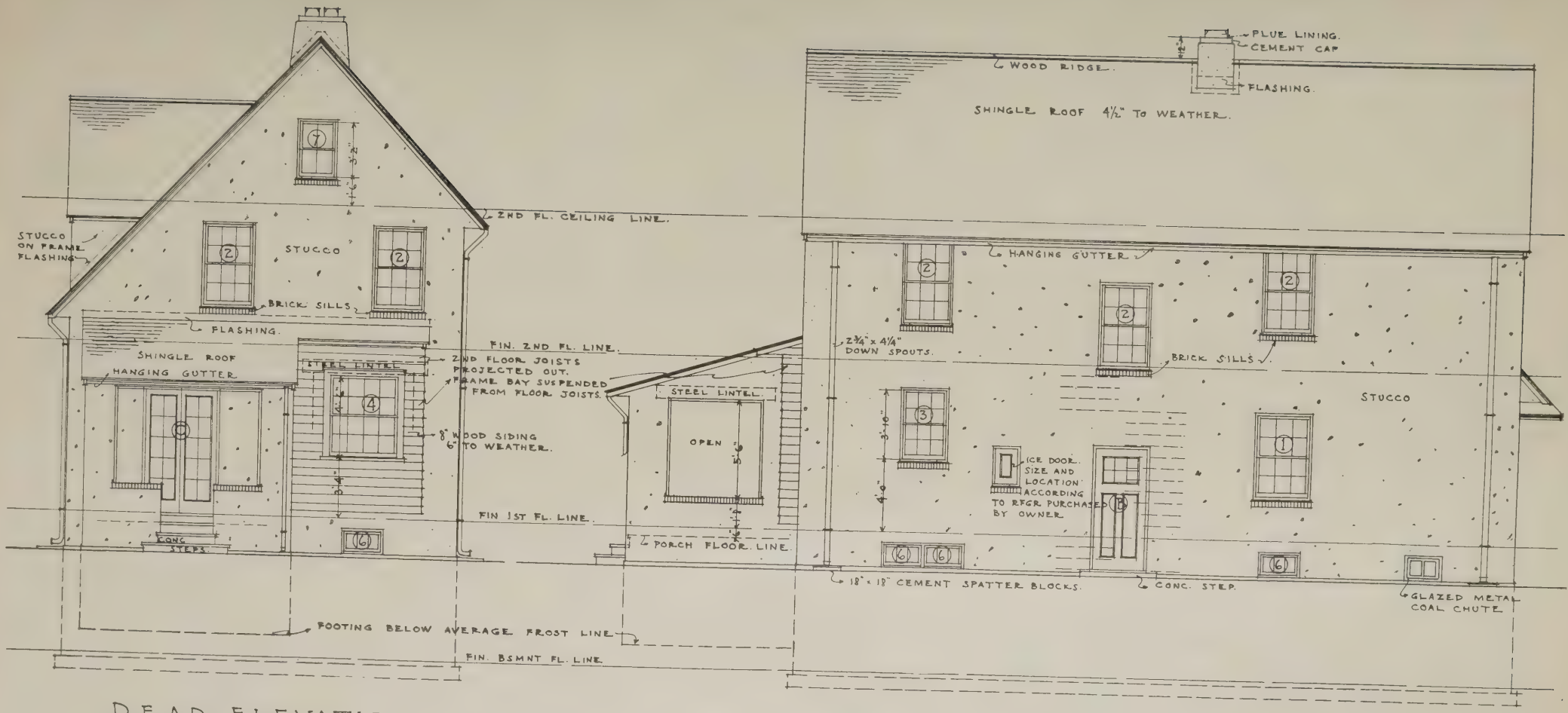
Foundation walls shown concrete may be stone, brick, concrete block, or load-bearing hollow tile.

Where building ordinances permit, foundation walls may be 9 in. thick (with 20x9-in. footings) except in case of stone, which shall be 18 in. thick.

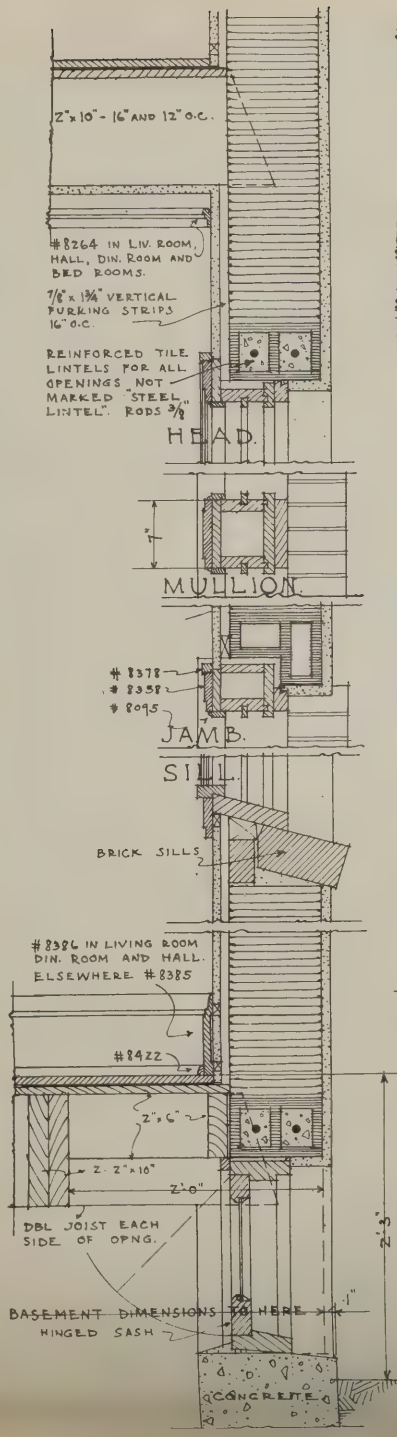
Stock numbers refer to moldings in Universal Millwork Design Book No. 20. In case these moldings cannot be procured, others of similar design and size may be substituted.

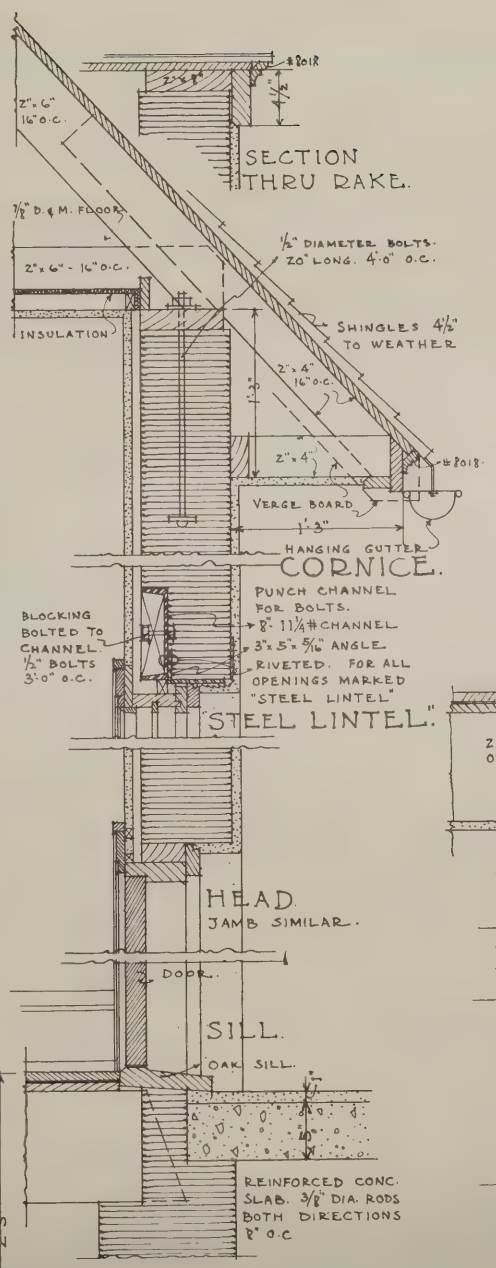
Provide 1⅛-in. screen and storm sash for all exterior openings except ice door unless otherwise noted. Bottom rail of storm sash to have vent.

MATERIALS		ELECTRIC WIRING SYMBOLS			
CONCRETE		CEILING OUTLET		3 WAY SWITCH	
BRICK		DROP CORD		GAS OUTLET	
WOOD		BRACKET		PUSH BUTTON	
PLASTER		BASE PLUG		BELL OUTLET	
		SWITCH		BUZZER	

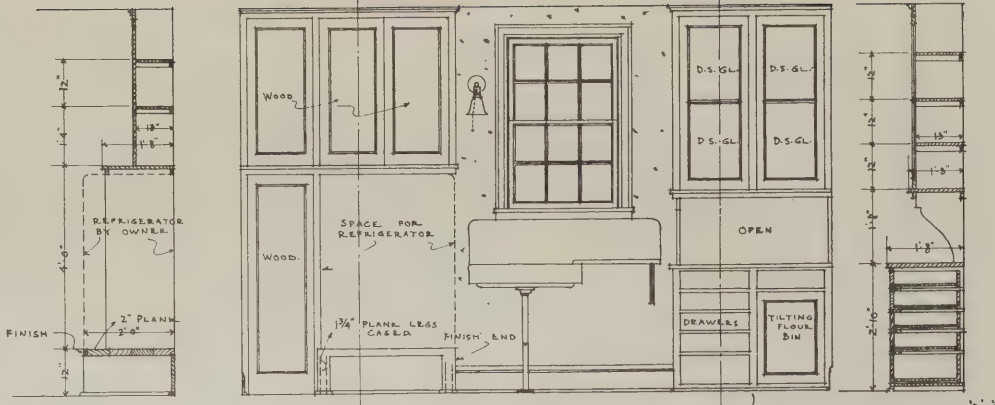


Rear and side elevations of House No. 6A51, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc. Copyrighted by National Builder and The Architects' Small House Service Bureau

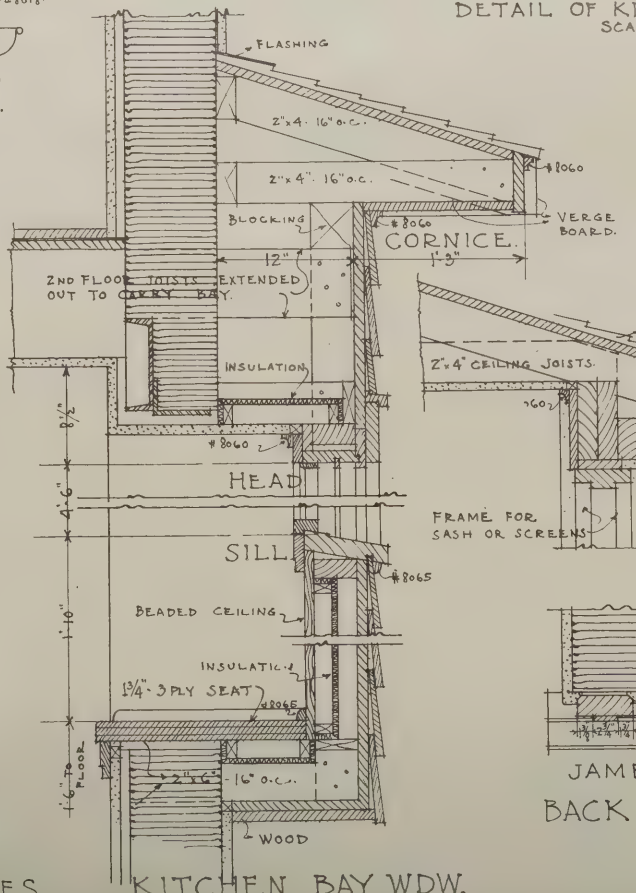




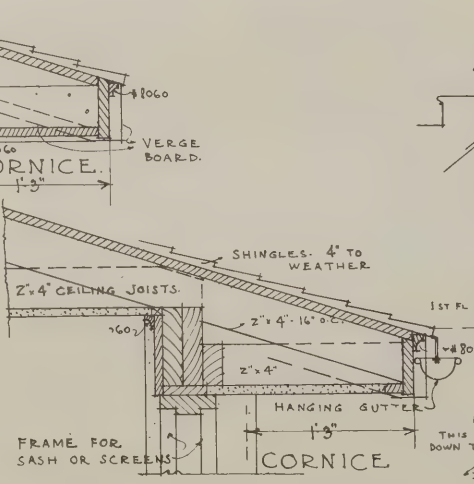
CORNICE AND TYPICAL EXTERIOR DOOR FRAMES.

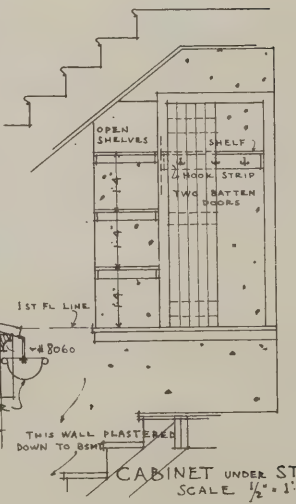


DETAIL OF KITCHEN CABINETS.
SCALE ½" = 1'-0"

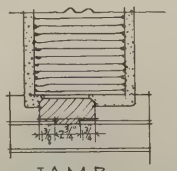


KITCHEN BAY WDW.





CABINET UNDER STAIRS
SCALE ½" = 1'-0"



JAMB.

BACK PORCH.

DETAILS OF FRAMES, CORNICES ETC.

Paint as an Aid to Renting and Selling

3. The Treatment of Walls and Ceilings

By Albert Brace

In a previous installment it was remarked that where the painting of *exteriors* is directed primarily toward preservation against decay, the painting of *interiors* is generally planned with the idea of decoration uppermost. Since wall and ceilings represent the largest, as well as the most important item of area in this field, this article will deal with them exclusively, leaving floors and woodwork to be dealt with in a subsequent issue.

Considering a room or a series of rooms as a picture, walls constitute the background and as such call for the most careful sort of thought from many angles. They are particularly a problem for the builder who rents or sells for the reason that unlike the city apartment dweller who redecorates in the spring with the dominating tones of his rugs, drapes and upholstery in mind, he must select something so neutral in color scheme that will harmonize with almost any furnishings, yet not so characterless that it will repel the prospective buyer or tenant.

Moreover, the builder must bear in mind questions of maintenance—will the walls quickly catch and tenaciously hold dirt in such a manner that they are difficult to clean and keep clean? This is an important point not to be overlooked in dealing with women prospects these servantless days. Are the walls of such a texture or color that they reflect artificial light too harshly or do not diffuse it so as to make an attractive evening interior? Finally, the color or colors and their arrangement tend to make the room appear smaller, larger, narrower or lower than it really is?

All of these questions receive their answer in the manner in which the builder chooses to operate and as the subject is one of wide, light reflection and color combinations will be treated at another time; here we present the range of choice in materials afforded him will take up all of the space permitted here. These comprise in general: Oil paints, water paints, wall paper and patented wall coverings such as Sanitas which often give a painted effect. A volume could be written on the merits and possibilities of each, but for obvious reasons the first two only will be described.

Oil Paints

Oil paints naturally subdivide themselves as follows: Flat Wall finish composed principally of lithopone, zinc oxide, tung oil, a flat drying, waterproof varnish compound, and mineral spirits. In its class it is unquestionably the most popular with the practical man and the consumer alike. Many excellent brands are on the market ready for use in convenient packages and made up in attractive stock colors which may be selected from a chip card. Individual shades are easily procured by mixing white or various tints in suitable proportions and the goods may be used on radiators, hot water pipes and woodwork as well as walls. The colors are delicate but for the most part will not fade even when continuously exposed to sunlight; this is not always true of the white which when composed of an excess of lithopone, may turn a grayish hue.

Painters devoted to paste white lead for all painting work, obtain very satisfactory flat wall finishes by mixing white lead and zinc with turpentine (which has the characteristic effect of "killing" gloss beside giving penetration and aiding ease of brushing) and proportions of drier, and pale mixing varnish to give resistance to water. Turpentine is the principal liquid ingredient but does not provide a very tough film and for this reason so-called flatting oils are coming into favor. The flat finishes described in the preceding paragraph afford but one lustre, a sheen just off of a dead flat, but by manipulation of the relative proportions of varnish and turpentine or flatting oil it is possible with white lead mixtures to secure varying degrees of lustre, ranging from a dead flat or a semi-flat to an "eggshell" or a full gloss.

Enamel is a third finish and offers the same choice of lustre as the white lead mixtures. It is, however, considerably more expensive in first cost than either the lead or lithopone paints and is generally confined to the higher class of decoration. It is extremely effective in a wood or canvas panelled room and while hand rubbing is almost prohibitive, very good "eggshell" effects are obtainable from enamels especially prepared to dry out in a mellow, satiny effect without this labor. Good enamel stands washing longer and better than either of the foregoing alternative paints.

Water Paints

Water paints are better known as kalsomine and come in dry form for mixing with hot or cold water according to the brand. The principal ingredients are whiting which has the appearance of powdered chalk, china clay, dry colors (for the tints), casein and glue, the latter two constituting what is known as the "binder." The quality of the glue, has much to do with the efficiency of kalsomine as a wall finish; one type of glue dissolves only in hot water, another will mix with cold water, hence the two catagories.

Just as enamel may be said to embody the most expensive form of painted wall finish, both in point of material cost and labor cost, kalsomine is the cheapest. Good grades of enamel cost from $3.50 to $7 a gallon, flat wall paints and lead-oil preparations for $2 to $3 a gallon, whereas kalsomine sells for a few cents a pound. It is therefore the most foolish kind of economy to buy anything but the best, preferably a brand with a national reputation. Seventy-five cents worth will often be sufficient for an average small room.

Kalsomine, moreover, is very easy to apply. Where an enamel finish requires laborious building up (two coats over as many of undercoater with much sanding in between), good kalsomine covers satisfactorily in one coat, though a preliminary sizing may be necessary where wall conditions are not uniformly favorable. It may be applied with a large 6-in. brush, thus cutting down labor cost, as against a 3 or 4-in. brush required for properly laying off enamel, flat wall paint or lead and flatting oil.

Nevertheless kalsomine is cheap chiefly in first cost as it is nothing like as permanent as the other three forms of painted wall finish. Unlike them, it cannot be washed, and while sanitary in itself, catches dirt readily and strictly speaking is a wall tint rather than a wall covering. But for the builder it has certain inescapable advantages. If he is in a hurry to complete a job it is a boon, for it is quickly applied and dries almost instantly. If he is selling and merely wishes something on the walls for the purposes of demonstration, which can be washed off and leave the walls in condition for a more permanent finish in line with individual preferences, it is also a boon. If he is renting and there is possibility of annual redecoration either for the incumbent or a succeeding tenant, it is again a boon.

Preparing the Surface for Flat Wall Paint

A good flat wall paint or lead and oil mixture can be applied with equal success over plaster, smooth or rough. Keene's cement, burlap, canvas, wall board, brick or metal and even over the old wall paper if it is firmly attached to the wall. When the woodwork is to be enamelled it is often expedient to give it a coat of flat wall paint along with the walls as it acts as a priming coat for the subsequent coats of enamel. Of course, this applies to white or very light tints—manifestly it would not do to prime the woodwork in green, blue or tan if the enamel coats are to be ivory or cream.

Much of the success of a flat wall or lead-flatting oil paint finish is jeopardized if the wall surface is not carefully prepared to receive them. In the case of new plaster, it must be rendered perfectly smooth by filling all cracks and sandpapering rough places. Any spots where the glazed plaster has been rubbed through should be rendered suction proof with shellac and then touched up with a dab of lead and turpentine. As there is apt to be much free lime present in new walls, this should be neutralized to prevent later burning through by a solution wash of strong vinegar to 4 gallons of water. Should the new plaster be soft, harden by sponging with water and allow four or five days to dry out.

The plaster wall is then ready to receive the size coat, which may be of oil, varnish or one of the patent products provided by manufacturers. This evens up the surface, hides all imperfections and by being tinted gives a uniform ground for the wall paint. A glue size is superior for sand finish walls, and for stucco or cement walls, the latter two of which must have caustic neutralizing treatment first. The reason for all this careful preparatory work will be seen from the fact that a flat wall finish to be beautiful must be uniform—any discolorations proceeding from neglected suction or "hot" spots will stand out in painful prominence.

Wall board presents an ideal surface for flat wall paint, particularly the brands that come ready sized and primed. One coat of lithopone or lead—flatting oil paint over them is all the treatment necessary and all preliminary chemical washing is obviated. If the wall board is not ready sized, a good interior varnish thinned to flatness with turpentine or one of the patent sizes will do the work, especially if slightly tinted with a small quantity of the chosen flat wall color as it thus takes the place of a priming coat. A glue size should not be used and unless there is moulding at the joints these should be carefully taped or filled to prevent the lines showing through the primer and paint coats.

Preparing the Surface for Kalsomine

As with oil paints, the first essential in producing a good kalsomine job is to assure a uniform surface. Kalsomining is almost always done over plaster, though it will adhere satisfactorily to wall board, burlap and canvas. It may be applied to wood and brick, but has a tendency to peel in time. As kalsomine is readily sucked into porous spots and slides over glossy streaks, it is customary to counteract the former contingency with a glue or patent size and the latter by roughening with a treatment of gloss oil or varnish size. One coat of kalsomine over this is almost always sufficient.

Many times ceilings of rooms, the walls of which have been oil painted or enamelled, are kalsomined and so far as the preparatory work is concerned, everything above said applies. White kalsomine is usually preferred, but it is much better to tint it very slightly off the white with the color predominating in the walls. This is especially true if the walls are a deep ivory or gray or a light shade of green or blue, as otherwise the contrast between wall and ceiling is too sharp for a good decorative and light diffusive effect.

Stippled and Tiffany Effects

It has been demonstrated in a large number of cases that unless very expensive rolls were used, the sale or rental value of a house is greatly enhanced if the walls are painted with flat wall finish instead of papered. Wall paper cannot be washed, flat wall paint can, wall paper has a certain life, flat wall paints lasts often for as long as nine or ten years. Yet many people will object that flat wall finishes are "cold" and uninteresting; for this class there have been developed the highly diversified stippled and glazed effects.

Stippling consists in tapping the second flat wall paint coat while wet, with a ball of crumpled paper, a brush or a sponge; some of the paint naturally comes off, revealing the lighter or darker undercoat and making an irregular pattern, something like clouds in a "mackeral sky." By rolling or twisting the paper, brush or sponge a variety of scrolls can be produced and by having the undercoat light gray for instance and the stippled coat dark gray, delightful combinations are possible. A few others are light gray—rose pink, light yellow—brown, light blue—dark blue, etc. It is possible to secure even richer effects by stippling still another coat, as for instance, gray, pink and light blue—there is no limit to ingenuity in this respect.

Tiffany work or glazing is done over a solid base tint of flat wall, lead-flatting oil or enamel with a special transparent glazing liquid. When this is still somewhat wet, another coat of the liquid, tinted to the desired shade, is applied and rumpled in the same way as described above. It differs from the stippled flat wall paint in that a somewhat richer, deeper and more lustrous effect is produced, similar that afforded by expensive wall paper It is, of course, washable.

Kalsomine is rarely stippled though is possible to do so if two men wo rapidly together, one brushing and t other mottling practically as the bru stroke is completed. Lead and flatting may be stippled—in fact it is desirable do so in order to hide the brush mark Enamel is sometimes stippled, but enamel is chiefly used on walls that a panelled there is not the same necessi for enlivening as there is with plain wal Nevertheless very handsome panelled e fects are produced with white or ivo enamelled mouldings and rose-gray, blu grey or yellow-gray stippled interveni wall spaces.

While flat wall paints of all brands a described as washable, this is true only to a certain point. Some will stand on one washing, some two and some mo depending on the makeup of the goo the number of coats and the nature of t washing. A good way to insure protract washability is to starch the walls. To a large room add to a handful of ordina laundry starch enough cold water to di solve, then thicken up to a clear jell wi boiling water. Add more cold water un the consistency of milk has been reach and brush on. This starch coat will n affect the color of the flat wall paint—fact it is with difficulty that its presence discernible at all. By reducing the poro ity of the paint it makes it much easi and quicker to wash.

Where Walls Need Protection

In kitchens and bathrooms, the trea ment of the walls should take into co sideration the matter of protecting the against steam and water as well as t decorative effect, for if the moisture fin an opening and gets back of the paint, will cause the film to loosen and event ally fall off. For this reason kalsomine out of the question and even flat wa paint, with its porous surface, is less d sirable than enamel or lead and oil.

The preliminary preparation of the wa is the same as for walls in other roo in the house: The plaster should be tho oughly dry and free from hot lime. good procedure from there on is a fir coat of white lead and oil (rather thin), t second coat lead with some flatting oil well as linseed oil and the third coat t same with less linseed oil. Of course goo enamel undercoaters may be substitut for the lead and oil but the fourth and fin coat should be a high-grade enamel, eith gloss or semi-gloss, carefully brushed o This may be tinted, but white is custo ary for bathrooms and increasingly so f the kitchen. A cream, ivory, light blu green, tan or gray is entirely appropria for the latter, but stippled or glazed e fects are out of keeping with its utilitari character.

(To be continued)

Questions, Answers, Kinks and Discussions

Edited by V. L. Sherman

Herein is a Department of Mutual Help for the Exchange of Experiences and Ideas. It is Not Only Well Worth Your While to Give Your Experiences for What You Get Back from Others, but National Builder Pays You $5 Each for Every Good Kink

To Draw Up Those Last Five Flooring Boards

THIS kink, from H. G. S., has to do with snugging up the last of the flooring. He says he has used it with very satisfactory results. See Fig 1.

"First bore with a 1-in. bit a series of holes, about 2 ft. on centers, through the sub-floor flush with the face of the base board that you are to finish the floor against. It is not necessary to bore the holes vertically as a slant to allow a full sweep of the brace does not hurt. Then

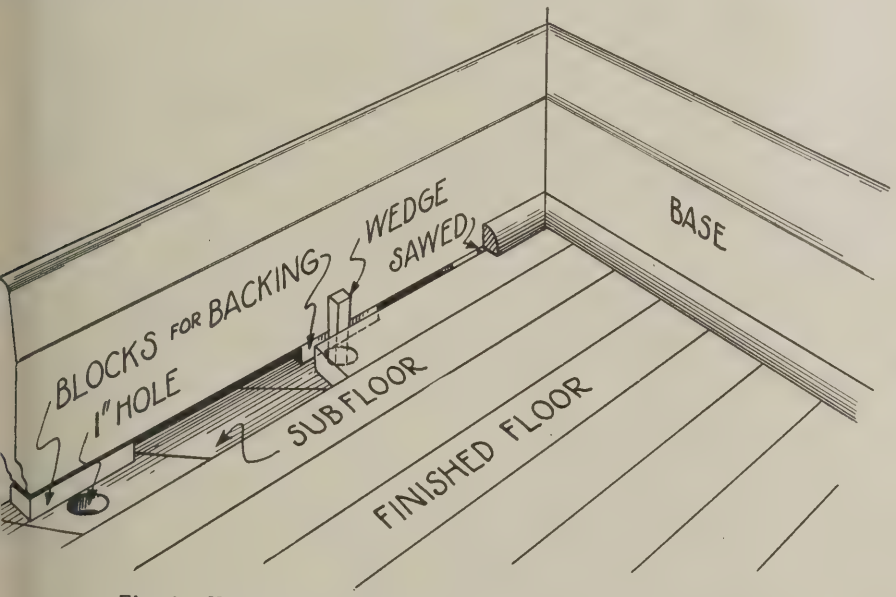


Fig. 1—Kink for drawing up the last few boards of a floor

t some scrap blocks the thickness of the se and 4 in. or 5 in. long and place under se opposite bored holes. These are for cking. After this lay finish floor up to :e of base. Secure as many wedges as u have holes, stair wedges are the best, 1 drive them down through the bored les and draw the floor up to a joint and ld it there. Having it all wedged saw the wedges flush with floor and the job complete. The base shoe will cover the of the wedges and the floor will stay ere you leave it."

Another Use for a Bit

"A GOOD way to cut a round hole in tin," writes R. E. J., of Philadelphia, "especially when putting locks on a Kalamein (metal covered) door, is to punch a nail hole in the center of the part to be cut out. Then take a brace and bit of the proper size for the hole. Put the worm in the nail hole and turn brace backwards, keeping a good pressure on the brace. The bit must have a good lip. Practically no damage is done to the bit, and a neat round hole is cut in the tin."

Intersections in Change of Pitch

THE following letter, from A. N. P., of San Diego, Calif,, has to do with the intersection of the timbers in roofs where there is a change of pitch. "Let us take the verge board where it joins the horizontal member at *AA*, Fig. 2. We see this commonly nowadays in the truncated gable of the bungalow It may not be handy to pass the board across and mark the edges. To do it with the square take a length of the rafter per foot run, say 14 in. as in 7 in. rise, and lay it on the piece, from *C* to *C*. (13.9 in. is a little closer than 14 in.) Now take half the rise, 3½ in., on the tongue to the upper mark and slip the blade till it touches the other one and the angle is exactly bisected. This is not a

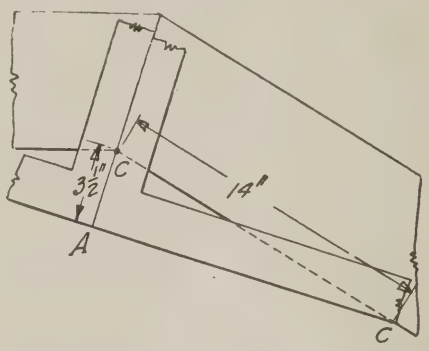


Fig. 2—Laying out pitch of rafters of truncated gable bungalow

new trick, but here is a new way to apply it as far as the writer knows.

"In a gambrel roof, where the change of pitch comes, and it is wanted to cut the frieze right off-hand, and to do it with the square and a piece of board: Lay off the

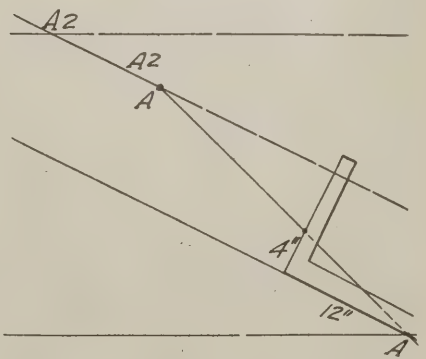


Fig. 3—Laying out frieze cut on gambrel roof rafter

pitch of the lower rafter, *A* to *A*, Fig. 3. We say 12 in. per foot, with the blade in the same position at *A*, Fig. 3. Lay off the pitch of the top rafter, 6 in. per foot in the case

A. Now measure up a foot on this line and square it to where it crosses the first. The distance is 4 in. Then 4 and 12 is the angle where the two meet. Now go to the first example. The diagonal of 4 and 12 is 12¾.

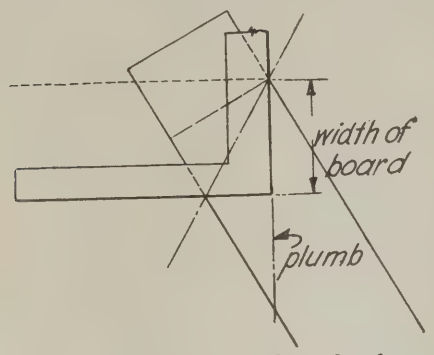


Fig. 4—Laying out pitches of rafters

(12.65 is a little closer.) Half the rise is 2 in., etc. If the line of the top rafter *A*-2, *A*-2 is drawn in position, and the lower line *A*-*B* is consideerd in a level position, the problem is simple."

The diagram, Fig. 4, comes in from R. V. L., Chicago, without comment, but applies the same principle.

Weatherproof Casement Windows

FIG. 5 is a section of the lower part of a casement window drawn by J. B., Mauston, Wis. He writes: "I have been in the carpenter trade 42 years but am sorry to say that I never find details for casement windows or cellar windows to make them rain proof. Twelve years ago I built for myself in Wilmette, Ill., and used casement windows only. I made my own details and frames and was never troubled with leaks.

"I am enclosing a detail for these windows. It is necessary to bring the joint between sash and sill up high, so that the wind cannot blow the rain through. This is the cause of many leaks. The piece *A* is built in the frame and turns the water back before it reaches the top."

The editor has had the sash extended in dotted lines and wishes to point out that of all the leaks in casement windows the ones around the lights are the meanest. Look out for poor glazing.

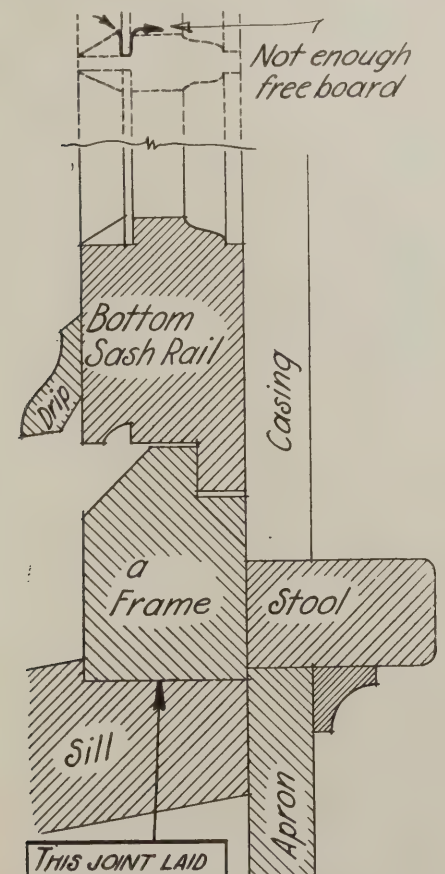


Fig. 5—Section of lower part of weatherproof casement

Frost Proof Basement Walls

N. H., of Ulen, Minn. sends the sketch Fig. 6, showing a cheap construction for a frost-proof basement wall. In cold weather the wall above the grade line should carry extra protection if the temperature is likely to be below zero for any length of time.

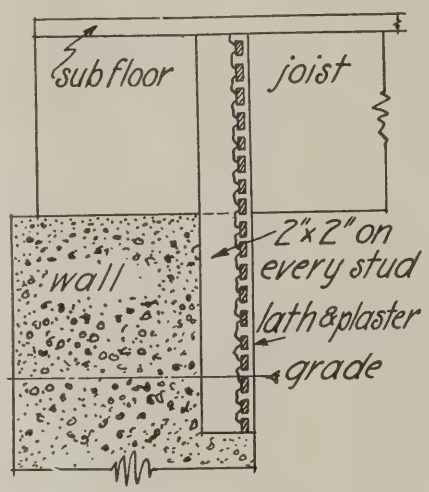


Fig. 6—Details of a frostproof basement wall

"The 2x2 in. is nailed to the side of the joist. Lath and plaster up to the under side of the floor in between the joists. The 2x2 should be nailed in placed before the concrete sets too hard, or as soon after the forms are removed as possible. The nails can be driven in the concrete wall."

A Handy Clamp

H. C. H., of Bangor, Me., furnishes the sketch for Fig. 7, and writes: "I am sending the drawing for a device I have used for years and could not do without. Its purpose is to hold a bent pilaster in line while it is being nailed in place. The numeral 1 is a small iron wheel with the center threaded to turn on a 14-in. bolt, the end of which, 3, is bent at right angles and flattened to grip the edge of the casing. 2 is a wooden block, bored to receive bolt and is intended to press against window or door jamb. For hardwood finish, especially birch, having a tendency to warp sidewise, this tool is a great help to the workman."

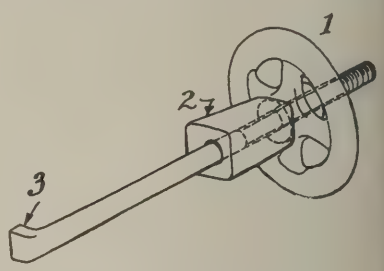


Fig. 7—A handy clamp

H. C. H. also furnishes the sketch for a tool he has used to remove the fins from concrete walls after the forms are removed. "The tool is surprisingly effective in spite of its simplicity (Fig. 8).

"Get a piece of good steel, 3½ in. wide and 18 in. long. The ends should be squar and ground on a small carborundun wheel so the corners will be sharp wit the middle slightly concave. Both end can be ground. This tool will do wonder removing fins and straightening up bulg ing places, etc. The side of the tool make a good straight-edge, while the corne will knock out a projecting pebble ver neatly."

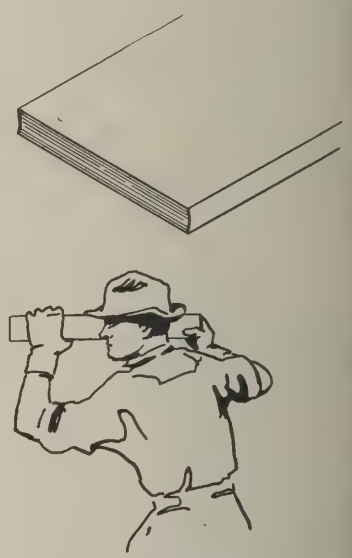


Fig. 8—Removing fins from concrete walls

Questions and Answers

"IN the NATIONAL BUILDER for April th man who desires to carry a galvanize pipe alongside his soil pipe till above th bathroom and then join them, thus mak

ing a flue for his gas stove, is surely breeding trouble. Gas, as well as soft coal, makes a corroding smoke that will eventually eat his galvanized pipe full of holes and then the gas smoke from his heater would use the wall space for a flue instead of the pipe. Better run two soil pipes alongside and join at point above bathroom and let one intended for flue elbow out into basement for flue hole. No city inspector would or should tolerate the other method. (Would the correction of the one fault make the plumbing any safer?—Editor.)

"I wish to call attention to a common error in making concrete basement floors. It seems to me that nearly every contractor puts cinders under basement floors. I recovered from this error way back in 1906. The object of cinders under concrete is to prevent heaving by frost. A basement has no frost to combat, so no cinders are needed. Recently three houses of nearly the same foundation area were erected near me. One of them was my own. One man expended $21 for cinders, to go beneath the basement floor, the other $17 for his floor, while I put none beneath mine. The first mentioned had the bottom cellar block just about hidden when the floor was finished, the second had about half a block covered. When the big rains occurred a few weeks ago, both floors started to float by hydrostatic pressure, the cinders allowing a subterranean lake to accumulate beneath their floors. One man drilled several holes near the drain outlet, thus giving relief. The second man cut a trench through his floor 4 in. wide along one wall to let the water escape to the outlet. My cement floor, on account of scarcity of help, had to be put down in seven different sections —generally one section in two days. All were laid on a mud base. Near the walls it is 3 in. thick and 1½ in. only at the drain outlet. My floor is as solid as the Rock of Ages' and not a drop of water is leaking through anywhere because the water can not get beneath the concrete. My floor shows dry, while theirs looks waterlogged. My floor cost less than 5 cents per square foot with help at 50 cents per hour, $3.20 for cement and $2.50 a load for gravel of 1½ yd. each.

"Garage floors will be much drier if laid on the mud than on cinders. The driveway approach to the doorway should have cinders up to the wall line where doors swing. Foundation walls should go down about 18 in. below grade. Then a good floor is assured. Four inches is deep enough for garage floor and top should be one or more inches below grade line. Several years ago a cement worker, while the owner was away, hurried a basement floor into place without cinders, thinking he was beating the owner to that extent. On the contrary, he did him a great favor, for a more satisfactory floor can not be found anywhere."

How to Draft Out Hip Rafters

113. A. B. H., Columbus, Ohio, writes: "One of the things I have never been able to figure out to my satisfaction is how to draft out the hip rafters, if it can be so called, where one dome or vault intersects another, as in a church with dome ceiling, where arches over windows intersect the dome over the main building. I would like to see a solution of this."

Answer.—In the case of church roofs, or where the span is proportionately large, the rafters are usually supported by trusses. These trusses are of varied design to fit the roof lines but should be carefully planned to meet requirements of the different stresses. You will find Kidder's "Roof Trusses" well supplied with such work, and Howe's articles in Kidder and Nolan's "Architects' Handbook" very good. Unless the work is small, the design should be handled by an engineer.

Raising a Roof

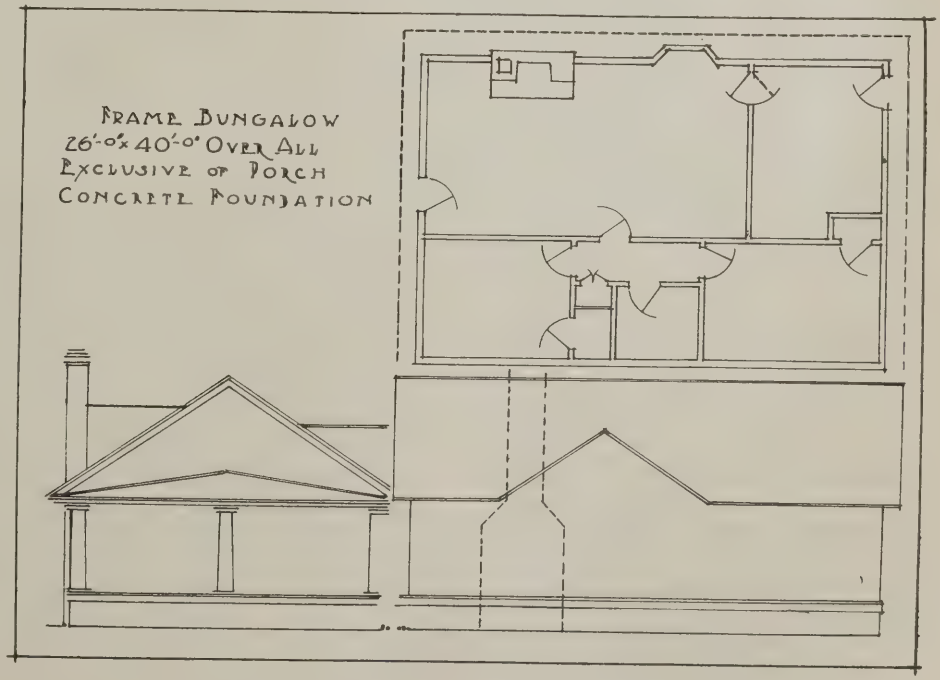
115. W. E. G., Bloomsburg, Pa., writes: "A friend and a client anticipates having the roof of his one-story bungalow raised eight feet to provide for an apartment on the second floor. How would you proceed to raise the roof? I am enclosing a plan similar to his house on which you will find some notations as well as the size of the house. The house is plastered and finished complete and the occupant expects to live in it during the change."

Answer.—A practical builder to whom this inquiry was referred answers: "Your roof raising problem interests me quite as much as it does you. But, my suggestion should be taken with a grain of salt as I haven't a great deal to go on. The main question is one of weight and wall stiffness. To begin with, no risks should be taken and the finished two-story house should be as strong as the bungalow. I have known more than one failure from 'raising the roof.'

"The number of supports necessary under the plate should be determined by the weight of the roof in sections and the size and condition of the present wall plate. Since the plate and the sheathing hold the roof longitudinally and the plate is really all that will prevent a sag, have enough points of support. Write to the National Lumber Manufacturers' Association, International Building, Washington, D. C., for "Maximum Spans for Joists and Rafters." That pamphlet will give you the figures necessary for roof weight and bending stresses.

"At a guess, I should say the studs should be parted about 3¼ in. below the plate after the roof is shored from outside. The shores should be braced to prevent side slip and sway. After raising the roof just enough, substitute new wall plates, joists, rough flooring and bridging. The rough flooring to go on diagonally and covered with paper. From there on, jacking the roof would be a matter of judgment, whether to work from the outside or to use the old wall. When the roof is not fixed, it becomes a live load instead of a dead load, and in this case becomes a very risky load. Supports should be tied up diagonally to prevent chance of sway. Wind is the chief danger. Your chimney and soil stacks must be taken care of, and if the gable dormer shown is not tied at the plate, it should be. Watch constantly for weak spots and correct such before they cause injury to the structure.

"A friend offers the suggestion that it would be really cheaper and more satisfactory to build a new wall over the old plate and over the old roof. When the new roof is far enough along the old roof could be torn out."



How to put another story under this bungalow roof?

What Do You Know About These?

Here are a number of things some subscribers are asking about. If there is anything in the idea of mutual help and co-operation in the building arts, here is a chance to put it in practice. Some of the services wanted should be paid for, and we shall be glad to put the inquirer and those who can give the service in communication with each other, but there is a whole lot of information that can be supplied by those who have gone through the mill, and their compensation must lie in the consciousness of having helped a fellow builder out of a difculty or in the idea that they will get help from the same general source when stating their needs in this column. Questions received after the 20th of the month will have to hold over one issue. Get them in early. Answers the same.

Broadcasting the requests of inquirers for information has the advantage of gathering practical experiences and of showing what attempts are being made to promote, improve or simplify construction or the business of construction. Who has suggestions to offer to the following questions, or who knows of better methods than is indicated by the answers?

Wants Black Mortar Color

117. L. L. Alston, Lake Charles, La., writes: "I have been unable to get a black mortar color that will hold its color. I would appreciate very much if you could recommend a color that will hold. I have been using a black and mixing about one-sixth of red, but this is not quite satisfactory. I want a jet black that will stand." The names of manufacturers have been sent the inquirer, but he would like to hear from brother builders.

A Colonial Style Double Flat

118. G. N. D., Hartford, Conn., writes: "Will someone inform me if they have ever tried adopting an American Colonial style for a double flat, having the appearance of a single house? Singles are better homes, but no income, and with land what it is in Hartford a double house is quite necessary." If any builder or architect can serve this inquirer, his name and address will be furnished on request to this department.

Answer.—See page 52 of the April issue of NATIONAL BUILDER and page 53 of this issue for plans of two-family houses. Henry W. Grieme, 110 Engineers' building, Cleveland, Ohio, has just published a "Portfolio of Two-Family Houses," in loose leaf form and it is his intention to add to it from time to time. It is 11½ by 14½ in. in size, and is bound in heavy flexible cover stock, printed in gold and green and embossed in black. The portfolio sells for $2.50. A review of this appears on page 76 of this issue.

Plan Reading and Other Matters

114. J. W., Seattle, Wash., writes: "1. Which is the best way to learn plan reading and estimating—in a correspondence school or just by home study? 2. How should you place the flush bolt on a 7-ft. door—the long or short flush bolt at the top? 3. How do you figure the depth of a concrete beam—from the top or bottom of the slab? 4. Which is the proper way to place a transom—with the stop beads into the hall or into the school room?"

Answer.—1. Plan reading and estimating are generally well taught through reliable correspondence schools. Such schools can supplement the course with other studies to suit the progress the student has already made. These studies are often quite as essential as the plan reading and estimating work. Practical application through everyday work, observance of market reports, and study of trade conditions should go along with it. Plan reading is more or less cut and dried, but intelligent estimating is another matter.

2. The short "flush bolt" should be placed at the top, if one is shorter than the other. They are generally the same length.

3. I am not sure that I understand your third question, "How do you figure the depth of a covered beam, from the top or bottom of the slab?" The depth of a beam is the depth of the actual beam. Strength and stiffness may be increased by other pieces but the depth of a beam is of the beam itself.

4. Transoms usually open into a room, and are adjusted from within the room. Ventilation or obstructions might make it advisable to reverse.

White-Coating Plaster Board

119. F. G. B., a builder in a New Jersey suburb, sends us the following letter which is presented herewith in the hope it will provoke discussion.

"Will you help me out on the following? A claims that he can white coat on plaster board and get satisfactory results. I claim he cannot. I claim that it will chip, crack, and often fall off. I never tried to white coat over the above but I cannot believe that it can be done to good advantage. I have others tell me that so and so is doing it but I would like to find out myself. I am generally willing to take a chance but this time I want some other people's advice."

Fire Tests of Plaster on Metal Lath

THE EDITOR—In connection with your article on page 68 of the March issue based upon the Underwriters' Laboratories reports, there is a statement that is subject to misinterpretation. You said that while the metal lath secured a one-hour rating and wood secured but a four-minute rating, the conditions of the tests on wood lath were not the same in all respects as on metal lath. As a matter of fact, the test conditions, that is, the size of the panels, temperatures and method of interpreting the rating, were identical and followed the Standard Time Temperature Curve, which is a tentative American standard.

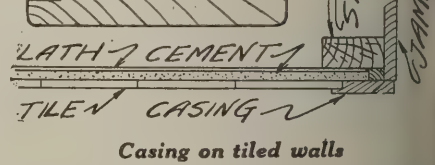
It is true that the plaster used in one case was different from that used in the other, but the failure in the wood lath sample did not occur in the plaster but in the fact that the wood lath was quickly ignited and disappeared, leaving the plaster without support while the expanded metal lath, on account of its fine mesh and reinforcing ability, remained in position and held the plaster in position long after the plaster was entirely disintegrated.

The expanded metal lath is a network of meshes which are so close together that disintegrated plaster of any type will remain in position for a long period of time. Other kinds of plaster than that used in this test will shortly be tested at the Underwriters' Laboratories, and preliminary tests indicate that any kind of plaster will be entitled to the full one-hour rating when applied on metal lath.

WHARTON CLAY,
Commissioner, Associated Metal Lath Manufacturers, Inc.
Chicago, March 19, 1923.

Casing on Tiled Walls

One of the disagreeable features of a tiled wall is the fact that occasionally, due to inferior workmanship or some other cause, an unsightly crack is left where the tile butts against the door casing. Methods of tiled wall construction differ, some preferring to butt the tile against the casing while others prefer to cover the butt end of the tile with the casing. When tile is butted against the casing, a crack, due to settlement, or shrinkage of the casing, is almost



Casing on tiled walls

inevitable, no matter how careful the workmanship.

A good plan to follow is to let the tile run past the casing line about one-fourth or one-half inch so that the casing will lap over it. The casing may be planed down for the width of the lap as shown in the figure if the tile surface comes above the casing ground. Then if the casing warps or shrinks, that part of the tile under the casing will show and the crack will be eliminated.

Latest in City Apartment Houses

Radio Installations May Become a Necessity

By William S. Hedges
Radio Editor of The Daily News, Chicago, Ill.

A NEW JERSEY builder has set the pace for apartment house owners in e construction of a 72-apartment build- g in Newark completely equipped for dio service to the tenants. Every apart- ent is supplied with a plug-in socket so at when the urge is upon the tenants to ar what the ether waves are saying, they n put on a set of headphones and plug on the broadcasts. Not only are the nants thus favored, but the boiler-room lp is permitted a radio recess.

The equipment in the Ritz apartments nsists of a radio receiving set and a high wer amplifier located in a pent house on e roof, where an operator tunes in for various stations. The set has four tubes which provide a means of detection, two stages of radio frequency amplification and a single stage of audio frequency amplification. The complete set is operated on dry batteries.

The broadcasts picked up by the receiver are wired to each apartment by means of an adaptation of the Western Electric public address system. This, of course, means that the listeners cannot wander afield except as the operator changes from station to station looking for the type of entertainment that will please the greatest number of the tenants.

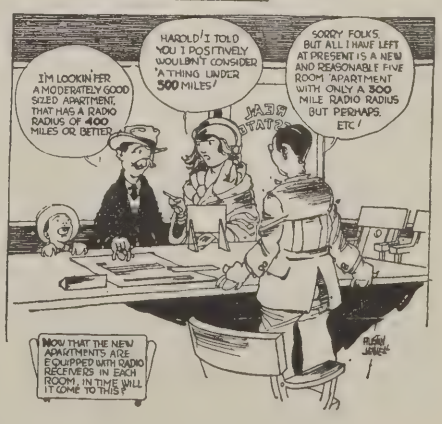
The diplomacy and ability of the operator may be attested by the fact that there is very little elevator service required in the evenings, according to F. B. Kopff, superintendent of the building.

The receiving set is able to pick up any 500-watt broadcasting station in the United States. The signals received are put into the amplifier by means of a specially designed input coil.

It would be possible for the tenants to install loud speakers but Mr. Kopff discourages their use, lest 72 projectors begin shouting the radio entertainments at the same time, turning the structure into a bedlam of noise. Head sets of a high impedance type are used instead.

Newark, N. J., apartment equipped to pick up any radio broadcasting station in the United States. (Both illustrations by courtesy of the Chicago Daily News)

IN THE YEAR OF 1947.


I'M LOOKIN FER A MODERATELY GOOD SIZED APARTMENT THAT HAS A RADIO RADIUS OF 400 MILES OR BETTER
HAROLD! I TOLD YOU I POSITIVELY WOULDN'T CONSIDER 'A THING UNDER 500 MILES'
SORRY FOLKS BUT ALL I HAVE LEFT AT PRESENT IS A NEW AND REASONABLE FIVE ROOM APARTMENT WITH ONLY A 300 MILE RADIO RADIUS BUT PERHAPS, ETC!
NOW THAT THE NEW APARTMENTS ARE EQUIPPED WITH RADIO RECEIVERS IN EACH ROOM, IN TIME WILL IT COME TO THIS?

Concreting a Well

A SUBSCRIBER in Colorado, H. N., writes: Will some reader of the NATIONAL BUILDER, who has had experience along the line of concreting wells, please inform me as to the most practical and suitable way of conveying concrete to the bottom of a well which is 100 ft. deep. Would you send it down in an elevator, drop it down in a straight chute or drop it down in a zigzag chute?

I have a job in the near future of concreting a well, 124 ft. deep and 12 ft. in diameter, from bottom to top and I certainly will appreciate any information that any one will give me either through the NATIONAL BUILDER or by letter.

C. D. Hale, manager of the structural bureau of the Portland Cement Association, to whom this inquiry was submitted, replies:

"This work is quite similar to the work of lining vertical mine shafts with concrete. A great many shafts of mines have been lined with concrete in various parts of the United States during the past few years. Several methods have been used in placing such linings. One of the most common used methods places the lining in the shaft between inside forms and the excavated wall of the shaft as the excavation proceeds downward. In this method sometimes the excavation is carried down to a depth of 20 or 25 ft., and this portion of the shaft is lined; then other sections are excavated and lined with concrete successively until the desired depth is reached. In other cases a temporary lining of timber is provided and the whole shaft is excavated before beginning to place the permanent concrete lining.

"The second method of lining a shaft with concrete is known as the drop-shaft lining. In this case the lining is built up and sunk down with the excavation in the same manner as used in placing concrete caissons. In other cases where rectangular shafts are involved they are lined by means of precast concrete slabs and beams.

"A third method has been used which consists of shooting a concrete or Gunite coating onto steel studs and lath.

"The monolithic lining mentioned in the first case is probably the most desirable to meet the conditions under which your well lining will be placed and is the one which has been most commonly used.

"A number of years ago the Kingdom shaft, owned by the old Dominion Copper Mining and Smelting Company at Globe, Ariz., was lined with monolithic concrete. This shaft was 1017 ft. deep and had previously been lined with timber which was destroyed by fire. It was lined in six sections of from 150 to 220 ft. each. The concrete was run from the mixer into the hopper and then conducted down the shaft through a 4-in. steel pipe to an ordinary steel sinking bucket suspended from the finished portion of the lining above and allowed to run through a hole cut in the side of the bucket a few inches above the bottom through a short steel chute into the forms. This provided a flexible arrangement, as the bucket could easily be swung or turned and a continuous swing of concrete directed to any part of the forms desired. In this manner concrete was dropped successively on occasions over 1000 ft. in building sections at the bottom of the shaft.

"The last method described appeals to us as being the most practicable, as it would be possible to allow each batch of concrete to pass through the pipe and clear it completely by discharging into the bucket below before another batch was started down. If the pipe is allowed to partially fill, it would be in danger of becoming clogged with concrete.

"For a depth of only 124 ft., and a comparatively small shaft or well, as described in your letter, we do not believe that it would be necessary to lower the concrete in a hoisting bucket, as this would require a fairly elaborate hoisting equipment for raising and lowering.

"A system of zigzag chute such as you suggested would require more work of construction than we believe would be justified. We would suggest that the concrete be dropped through a metal pipe or a rectangular pipe made of light 1-in. planks, discharging into a bucket supported just above the top of the forms having a hole cut in the side through which the concrete could discharge into a short chute and flow into the forms. A signal system could be arranged between the men at the forms and the mixer so that when the bucket is filled they could stop discharging at the top until a sufficient amount of the concrete had been used up."

Selling Houses from Models

THE illustration of the show window of the Century Lumber Co., Des Moines, Iowa, herewith is an example of a method of merchandising houses which is growing in popularity. This is a cardboard model of a house illustrated in NATIONAL BUILDER for September, 1922, page 33.

With the rapidly growing demand for *better looking* houses the use of these cardboard models is quite likely to continue growing because they not only serve to attract attention to window displays like that illustrated but are of real value in helping the prospective client to visualize what blue-

Effective use of cardboard models for merchandising houses

print plans mean.

There is a third distinct advantage t house designers, whether architects o builders, and that is these cardboard mod els, built to scale, are a great aid in prop erly proportioning the house. Architects o big buildings and monumental structure have long made use of small models fo this specific purpose.

The Architectural House Planning Serv ice Co., 20 South 18th Street, Philadelphia Pa., make a business of building mode from their own or any other's plans.

These particular models are so made tha they can be readily knocked down an folded, and reassembled, with very litt trouble, so that their storage when not use is not a serious matter.

Thus far enterprising lumber dealer seem to have been the ones to make th most use of these models, but there is n reason why building contractors and re estate builders could not use them wit equal profit.

The Situation—Wage Increases

THE outstanding development of the past month is the widespread tendency to increase wages—nearly everywhere and in every industry advances are being made voluntarily or without serious contests. Every employer knows that when the United States Steel Corporation leads with an 11 per cent wage increase for common labor and comparable adjustments for other classes of labor, that increases are absolutely necessary in order to continue doing business. The new wage scale in the steel industry is 40 cents an hour.

Other big employers of labor such as the Chicago packing-house industries, the railway maintenance-of-way departments, etc., have followed the lead and have made advances approximating 10 per cent. In most of these cases the laborers are unorganized, or very poorly organized. Where common labor is well organized, as in the construction industry, we find wages advancing to 75 and 85 cents per hour.

Chicago Employers Making Three-Year Agreements

Chicago construction trades employers have already signed new agreements with several trades unions on the basis of the Landis award terms for a three-year period. "It is agreed by both parties that this agreement shall remain in full force and effect from the date of same until May 31, 1926, except that the rate of wages shall be fixed for the period ending June 1, 1924, only, and that on or before February 1 of each successive year the Arbitration Board shall, at the written request of either party to this agreement, meet and fix the rate of wages for the ensuing year."

The signing of this document as a basis for all agreements by the Chicago Building Trades' Council and its ratification by three unions is one of the best indications yet received of a peaceful year in the building trades of Chicago.

Nevertheless much proposed work in Chicago is being postponed and contractors are said to be very shy of bidding on new work until after May 31, and the attitude of the building trades becomes more reassuring.

Strikes in Some Cities

Employers *everywhere* are not meeting demands for increased wages without resistance. There has been a strike of union painters in Washington, D. C.; getting $8 per day, and demanding $9 and a 44-hour week; electrical workers getting $8.50 struck for $10. At Worcester, Mass., hodcarriers getting 75 cents an hour struck for 90 cents. Some 1500 craftsmen in Omaha, Neb., struck for increases averaging 12½ cents per hour; carpenters from 90 cents to $1; electrical workers, $1 to $1.12½; iron workers, $1 to $1.12½; lathers, $1 to $1.12½; bricklayers, $1.12½ to $1.25 per hour.

The carpenters took a reasonable course and their action had an important influence in settling the strikes. Their statement to the public read:

> We, the same as every other class of people in the city, want to see the building which is now under way continue with increased proportions. Should we ask for an increase that would prevent construction, we would be working an injustice, not to ourselves alone, but to the public as well. Such an increase would enable the building contractors also to advance their charges. In this case, we feel that our increase is based on justice and not on our power as an organization to get something which conditions do not warrant.

There seems to be something psychological about the $1 an hour limit. The general public seems to have fixed on this as sufficient for a skilled workman. When wages get above this figure work will apparently recede, as it did in 1920; and it will not start up again until wages have receded to somewhere near a dollar or less.

There are signs elsewhere that the employers will not raise wages beyond the breaking point. When the building trades unions of New York City notified the Building Trades Employers' Association that each trade would expect increases from $1 to $2 per day, C. G. Norman, chairman of the board of governors of the association, came back with the following:

> We will not make an agreement to increase wages. We will not interfere with the housing construction work by locking out the bricklayers or any other trade, and if the people engaged in housing construction continue to pay a bonus, or increased wages, giving away all the benefits derived from tax exemption and the changes in the tenement house laws to union labor, merely because labor is in a position to hold them up, a buyers' strike is due in a very few months.

In Great Britain a lockout of the building trades has already occurred. The wages of building trades mechanics advanced out of all proportion to the wages of workers in other industries; and as a result there were few tenants capable of paying the rents that must be asked for the new buildings. This is the condition, of course, that many foresee in this country unless building trades labor is reasonable in its demands.

It will be noticed that the wage increases being made today are not asked for or explained by increased costs of living but are plain out-and-out concessions to a class which is in a position to make demands and get what it demands.

Get Together and Face Conditions Squarely!

Never was there a time when sound minds and level heads were needed more. We simply must not let the building situation "blow up," as many are predicting it will. If things are handled right and everyone does his share we shall have at least five years of building trades prosperity. If the building trades overreach themselves, the history of 1920 will be repeated. The building trades of Dennison, Iowa, have set a precedent that may well be followed in every community:

> "Some fifty men directly connected with the building trades of the city met at the Chamber of Commerce rooms recently to informally discuss building problems and acquaint themselves with the present day costs in the various branches of the industry. C. L. Smith, manager of the Green Bay Lumber Co., acted as chairman and Chester Schlumberger was elected secretary.
>
> It was explained that the meeting was not called for the purpose of adjusting prices of labor or the materials going into buildings, but for the purpose of getting acquainted with prices as they exist and the reason for present prices. Informal talks were made by lumber dealers, contractors, carpenters, hardware men, plumbers, electricians, painters, masons and several other branches. After these talks it was concluded that building costs are on a stable basis with little likelihood that there will be much of a reduction for some years to come. In some branches prices are a shade higher than they were a year ago, but taken as a whole the cost of building is practically the same as it was last year."

These men clearly recognize the problem before them—it is not to reduce wages and prices but to stabilize them. High wages and prosperity go together; but there can be too much of a good thing. If every community was as serious and conscientious as this little Iowa city, we should not have to fear for the future.

Four Remedies Proposed

The *Index* of the Associated General Contractors of America lists four proposed remedies for preserving prosperity in the construction industry and averting the threatened slump. They are:

1. Reduction in public-works construction by the Federal Government. According to the Federal Bureau of Efficiency, the Federal Government will spend approximately 6 per cent of its income or about $160,000,000 in 1924 for public works. To stop all or any part of this work will hardly be noticeable in a total construction program of six billions. However, such action on the part of the Federal Government will have its effect on state and municipal construction programs and indirectly on much private work which will follow the lead given and wait for lower costs.

2. A conscious steadying of prices on the part of manufacturers who may arbitrarily raise them during the next few months. The action of the portland cement companies in holding prices at a reasonable level during the recent rise in other construction materials, offers a far-sighted suggestion to other manufacturers.

3. A conscious steadying of wages on the part of labor in seeing that a fair wage over a long period is better in the long run than an unusually high wage for a short period followed by months of idleness.

4. A voluntary elimination of restrictions on the output of workmen now in effect in various building trade unions.

These things can be done immediately and they will have their effect. If every contractor, for example, begins to urge these four things, the rise is bound to be less steep and the break, if not averted, at least less precipitate.

Announcements and Publications

"A Treatise on the Law of Surveying and Boundaries," by Frank Emerson Clark of the Minnesota bar. This work supplies in handy, accessible form all of the laws pertaining to surveying and boundaries. It covers fully and in detail the problems encountered by the surveyor and the lawyer, in actual practice, and advises the proper procedure in solving those problems. Base lines, principal meridians, townships, subdividing townships, subdivision of sections, fractional lots, numbering and areas, marking lines and corners, highways, etc., are a few of the many subjects covered. Actual cases that have been before the courts are cited as illustrations. The book, which contains 631 pages printed on thin high grade paper, is fully indexed and is illustrated with over 100 diagrams. Size 5x7¾, cloth binding; price $5, postpaid. The Bobbs-Merrill Co., Indianapolis, Ind., publishers.

"Handbook of Steel Erection."—A practical handbook on steel erection methods and equipment. The book covers the erection of falsework in navigable rivers, of bridges, viaducts, buildings, water tanks, and standpipes and transmission towers. It also describes essential erection equipment such as cranes, derricks, travelers gallows, frames, jigger sticks, jacks, etc. Step-by-step examples of methods on typical steel erection jobs supplement the text. The author is M. C. Bland, A. S. C. E. and A. S. M. E. Flexible binding, size 4x6⅞, 241 pages, with index, tables and 39 illustrations. Price $2.50. McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York City.

"Practical Mechanics and Strength of Materials," by Charles Wilbur Leigh, B. S., associate professor of mechanics, Armour Institute of Technology. A simple direct presentation of those principles of mechanics and strength of materials essential for the practical man. The book develops mechanics and strength of materials as one continuous subject. Each chapter on strength of materials is preceded by those principles of mechanics necessary for its presentation. The reader who has a working knowledge of algebra, geometry and trigonometry will find this book easy to understand; 293 pages, 5x7½, 221 illustrations, with appendix containing formulae, properties, logarithms, trigonometric functions, etc. Published by McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York City. Price $2.25, with silk cloth binding stamped in gold.

Turns War Department Surplus Into Cash—One month after the armistice was declared, in 1918, the War Department had in operation a sales branch, under the supervision of Major James L. Frink, director of sales, whose duties were "to formulate, supervise and co-ordinate the selling of surplus supplies, material, equipment, byproducts thereof, buildings, plants, factories or lands embraced within the act of Congress, approved July 9, 1918." Since the establishment of the office of the Director of Sales, property originally valued at over $2,000,000,000 has been sold and the visible supply reduced to about one-tenth that amount, while estimates of future surplus to be reported will swell the supply another tenth, making a total of $400,000,000 cost value, which still remains to be sold.

Major classifications of property included

Major James L. Frink

airplanes and electrical equipment; animals; building materials; chemicals; clothing of every description, including millions of uniforms, underwear, socks, hats and other articles; soldiers' equipage, such as canteens, cups, knives and forks, haversacks, tin hats; electrical equipment, ranging from small fuses to complete power plants worth a million dollars each; metals, both ferrous and non-ferrous; fuel; hardware; land and buildings; leather; lumber; machinery and engineering equipment, ranging in size from a small pocket compass to the largest cranes built; machine tools; medical and hospital supplies; motor vehicles; animal drawn transport and equipment; office and household equipment; railway materials and rolling stock; floating equipment, from small size rowboats to the largest ships; ammunition; foods, textiles and wool.

In explaining how this extraordinary selling campaign has been conducted, Major Frink states:

"Not a single traveling salesman has been employed, but instead, with the exception of the Office of the Director of Sales, dependence placed in government agencies already existing, supported by a well-defined advertising campaign in the newspapers and business papers of the country. This campaign has been national in its scope, embracing every field of industry and has provided the widest possible publicity. Once every month the War Department program of sales is published throughout the country. Supplementing this, every important sale is extensively advertised so that industry and the public may be fully informed as to when and where sales are being held, what is being sold and how to buy it. The advertising appeal has been directed always toward established business, and not to the speculator. At every point the greatest difficulties have had to be overcome in the way of hostile propaganda, caused by mistaken ideas of the effects of our policies or a lack of understanding of what is best for the public good.

"Many times we have been asked the question, 'How to buy from the War Department.' Our reply is to permit us to place your name on our mailing lists to receive catalogues and other announcements of sales of materials in which you may be interested. When you get this literature look it over, select the items you want—if sold by auction, send your representative to the sale with sufficient funds to satisfy the preliminary conditions announced in the catalogue—if a sealed bid sale, send in your bid, accompanied by a certified check for the required percentage for deposit. Remember, if you will, our auctions are not wild scrambles or cheap affairs at all, but businesslike functions in keeping with the dignity of the government and its prospective customers."

"Keeping Down the Cost of Your Woodwork."—This attractive, practical and suggestive 16-page booklet will appeal to the contractor and builder and to his customers alike. It discusses the subjects of design and standardization in woodwork, and by apt illustrations of construction details points out the quality and economy that can be effected by the production in quantities of such items as doors, stairs, cabinet work, interior trim, and other "millwork" items. These technical phases of the subject are, however, only incidental to and in support of the main purpose of the book which is to give the prospective home owner and his contractor ideas for the proper selection of woodwork for the home. The booklet is 6⅞x9¼ inches in size, and is supplied free of charge upon request by the Curtis Service Bureau, Clinton, Iowa.

How to Make Soft Woods Beautiful as Hardwood

IT is generally admitted that wood finished in its natural shade cannot be worked as successfully into color schemes of decoration as stained wood. It is also true that color brings out the grain and enhances the natural beauty of most woods. For these reasons we manufacture a line of wood colors known as Johnson's Wood Dye.

Johnson's Wood Dye is for the artistic coloring of wood. With it inexpensive soft woods such as pine, cypress, fir, etc., may be finished so they are as beautiful as hardwood. Johnson's Wood Dye is very easy to apply—it goes on easily and quickly without a lap or a streak.

Johnson's Wood Dye is a *dye* in every sense of the word. It penetrates so deeply that the natural color is not disclosed if the wood becomes scratched or marred—it brings out the beauty of the grain without raising it in the slightest—it dries in four hours and does not rub off or smudge.

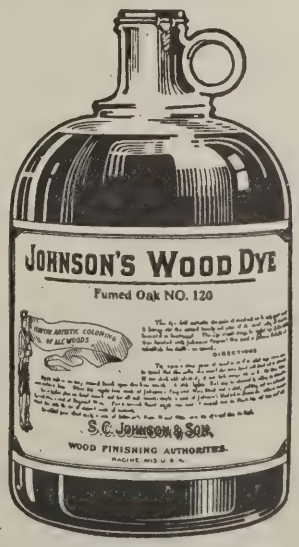
Johnson's Wood Dye is made in 15 shades, all of which may be easily lightened, darkened or intermixed—full directions on every label.

JOHNSON'S WOOD DYE

FREE—Book on Wood Finishing

It's the best book ever published on Artistic Wood Finishing — the work of famous experts — illustrated in color. This book is written for the practical man—it gives covering capacities, includes color charts, etc. We will gladly send it free and postpaid.

Use Coupon at Right



S. C. JOHNSON & SON
Dept. N. B. 5, Racine, Wis.
"The Wood Finishing Authorities."

Please send me free and postpaid your Book on Wood Finishing.

I usually buy varnishes from.....

.....

My Name.....

My Address.....

City and State.....

Announce Promotion.—Clifford F. Messinger, for the past three years general sales manager of the Chain Belt Co., Milwaukee, Wis., has been elected second vice-president, according to an announcement just made by the company. Mr. Messinger graduated from the Sheffield Scientific School, Yale University, in 1911 and entered the employ of the Chain Belt Co. the same year. He has at various times occupied the positions of advertising manager, manager of concrete mixer sales and general sales manager. He is also a director of the Chain Belt Co. and a director of the Interstate Drop Forge Co., Milwaukee. The Chain Belt Co. manufactures conveying and transmission chains, concrete mixers, conveying machinery, traveling water screens, all under the trade name Rex.

In "Merchandising Houses" NATIONAL BUILDER had something to say last month about how the contractor and builder can use advertising as a help in selling his services, securing contracts and selling the buildings that he constructs. The point is made that the manufacturers of building materials and accessories are often willing to aid contractors in carrying on their advertising. Comes now the Copper & Brass Association, 25 Broadway, New York City, with a very comprehensive system of advertising for the contractor and builder who wishes to identify himself as a builder of "houses that never rust," or, in other words, houses that contain plumbing, hardware, roofing, leaders, gutters and downspouts of copper and brass.

The details of this campaign are described at length in pictures and words in a broadside which the association is now mailing out. The novelty of this advertising is the personification of the figure of Rust, showing the demon in various devastating poses now tearing at hardware, now ripping down leaders and gutters and otherwise suggesting the ruin which results from the force of destruction caused by rust. By making use of the printed matter which the association furnishes without charge, contractors and builders can help educate their customers and prospects in a movement toward substantial buildings and at the same time take advantage of the vigorous appeal which the association, in its own advertising, is making to the general public. Its advertising is now appearing in 64 of the leading newspapers of the country every week, selling the idea of using copper and brass rather than the particular products of any individual manufacturer.

"Post-Industrialism," by Arthur J. Penty—This book is a discussion of the machine system of production as compared to the handicraft methods of the Middle Ages. Mr. Penty is a British architect and his conclusions are based upon years of study and his own practical experience with building under the present industrial system. He reviews the various "movements" which have been offered as solutions of the question of production and frankly recommends a return to medievalism, which he feels represents the golden age of the arts and crafts. Gilbert K. Chesterton contributes a short preface in which he characterizes Mr. Penty as being "one of the two or three truly original minds of the modern world." The thoughtful builder will be stimulated to further thought by a careful reading of this book. Published by the Macmillan Company, New York. The book is 5 by 7½ in. and contains 157 pages.

"Better Sheet Metal"—This is the title of a 127-page book, size 8 in. x 11 in., issued by the Stark Rolling Mill Co., Canton, Ohio, which is replete with illustrations of "Toncan" sheet metal in various uses, from window frames for the new building of the Bureau of Engraving and Printing, Washington, D. C., to every day uses in apartments, houses, barns and garages. The book also contains numerous tables on bundling metal sheets of various gauges, sizes and forms.

Constructing Ribbed Slab Floors—Bulletin No. 210, just published by the Blaw-Knox Co., Blawnox, Pa., describes a removable pan system for the construction of concrete floors which, it is claimed, is superior to and more economical than the system utilizing wood forms. The "pan" is a substantial form, pressed from No. 14 gauge steel, and makes unnecessary any bridging or posting to support the concrete runways. The removable pans are rented or leased through licensees, many of whom are in a position to furnish complete erection service.

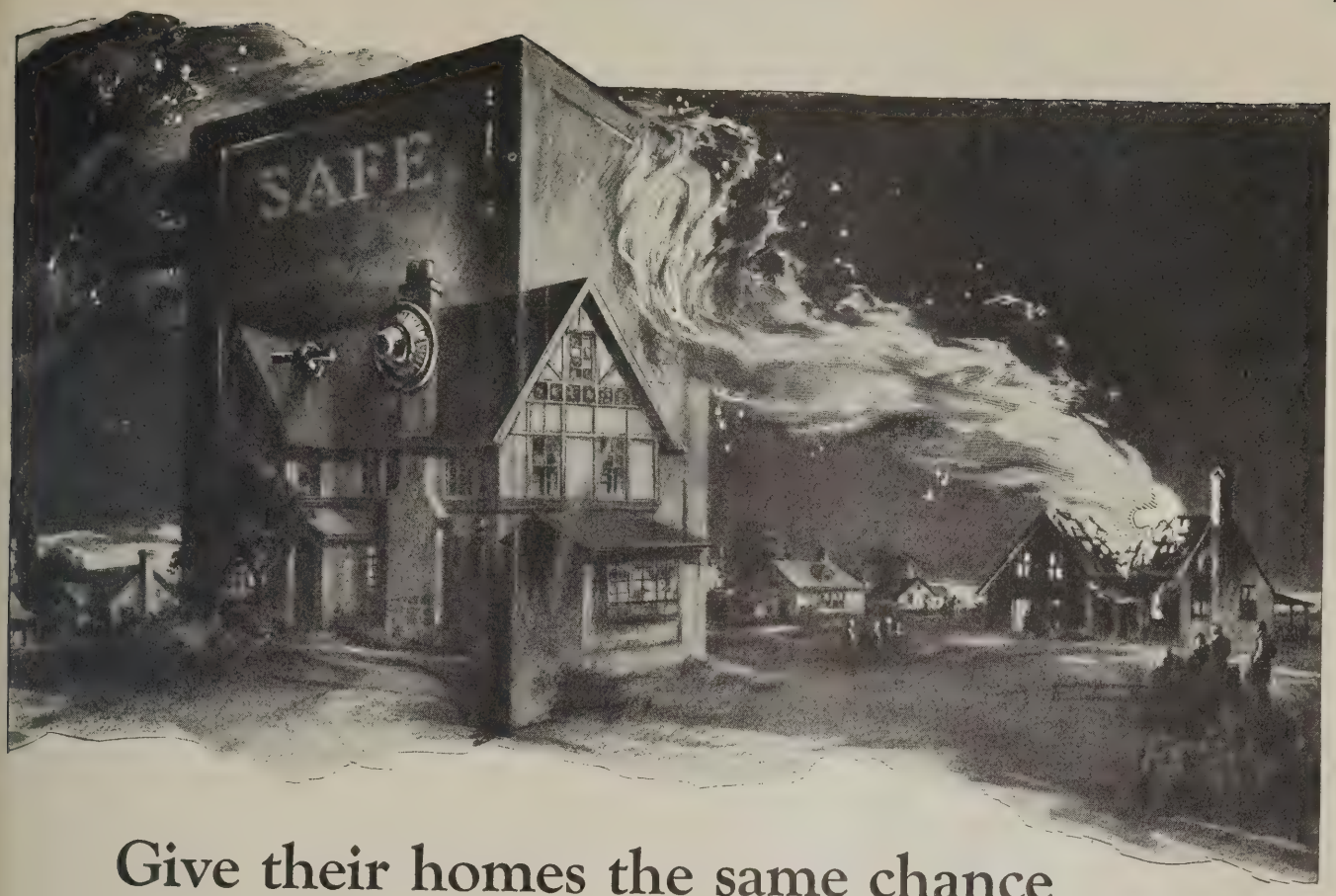
Bommer Spring Hinges, Catalog No. 47—The Bommer Spring Hinge Co., 251-271 Classon avenue, Brooklyn, New York, have published a 40-page catalog, 7x10, profusely illustrated in half-tone, presenting their complete line of spring hinges. Many types and sizes of butt, double-action, single-action, spring pivot, clamp-flange and surface spring hinges; strikes and keepers for lavatory doors, latches, door-bolts, indicators, lavatory stall standards, screen door spring hinges, door holders, push and kick plates, etc., are illustrated and priced.

"Flexural Strength of Plain Concrete," by Duff A. Abrams. This 26-page, 6x9 pamphlet is Bulletin 11, Structural Materials Research Laboratory, Lewis Institute, Chicago. It is an authorized reprint from the copyrighted proceedings of the American Concrete Institute, Vol. XVIII, 1922. The bulletin discusses the flexural strength of concrete, which is low as compared with its compressive strength.

"The Bungalow Book" by Charles E. White, Jr. A practical manual on building, equipping and furnishing the bungalow. Mr. White covers every detail of bungalow construction from the frame to the plumbing and painting. He has valuable suggestions to give on supervising the building of the bungalow, and he devotes several chapters to the subjects of electrical housekeeping, the garage, and gardening and landscaping appropriate to the bungalow. The book contains eight half-tone plates of attractive bungalows, several of which have been shown in NATIONAL BUILDER, and many pen-and-ink drawings by the author illustrative of the text. This is not a plan book, though a few floor plans are shown. 221 pages, price $2.25. The Macmillan Company, Publisher, New York City.

"School Architecture," by John J. Donovan and others. This issue of NATIONAL BUILDER describes and illustrates in detail the plan and design for a school building in San Luis Obispo, California. This plan is put before the readers of this publication as suggestive of the increasing attention that is being paid to school construction throughout the country. An important contribution to this subject, discussing the American school from every standpoint of its physical requirements as well as its social and practical significance, is to be found in the above mentioned book. This large volume—it is 9¾x12½ in size, with 724 pages—contains 28 chapters, each relating to a special phase of school house construction and written by a specialist in that phase, Mr. Donovan, who has made a life study of school buildings, editing the whole. The book is full of illustrations of schools of all kinds in various parts of the country. The preliminary sketch for the San Luis Obispo school is among the many shown. A 12-page double-column index increases the usefullness of the volume for reference purposes. The Macmillan Company, Publisher, New York City, Price $20.00.

"Portfolio of Two-Family Houses," by Henry W. Grieme, 110 Engineers Building, Cleveland, Ohio. According to the latest bulletin of the Bureau of Labor Statistics, United States Department of Labor, one-fourth of all the new family accommodations built in cities of 25,000 and over in the United States in 1921 were two-family houses and apartments. The bulletin states that the building of two-family houses is increasing at a tremendous rate and is reaching even the smaller communities. This is a fact of which NATIONAL BUILDER has long been aware and because of which has published from time to time plans and designs for many two-family houses and apartments. In 1922, NATIONAL BUILDER subscribers built 5794 "Duplex" houses and 9591 apartments. In this issue and in the April number are to be found the plans and designs for six two-family houses by Henry W. Grieme, architect, whose architectural service for architects and builders was described in NATIONAL BUILDER last September. As a result of the many requests that he has received for plans of two-family houses, Mr. Grieme has published a portfolio of 26 plans. The portfolio sells for $2.50.



Give their homes the same chance you give your business

WHEN a customer wants slate-surfaced shingles on his house, you know that you can sell or apply any particular brand that you care to.

The customer leaves it to your judgment. He feels sure that you will give him the best slate-surfaced shingle that the market affords.

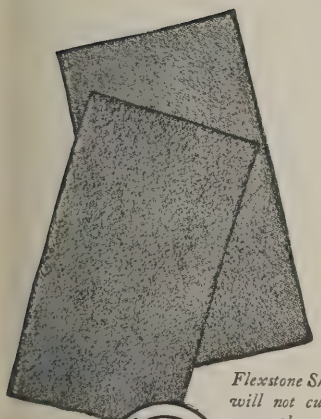
There is one slate-surfaced shingle that is vastly different from the average flexible shingle. It is the Johns-Manville Flexstone Asbestos Shingle.

The foundation of this shingle is a dense layer of asbestos rock fibre—in addition to the slate-surfacing and asphaltic filler common to other flexible shingles. The layer of everlasting asbestos in the Flexstone Shingle is a permanent protection to the roof on which it lies.

Where the average composition shingle is fire-resistant for a few moments only, a Flexstone Asbestos Shingle will withstand an intense flame for a very long time.

True, Johns-Manville Flexstone Asbestos Shingles cost a bit more than some others—but it is so little—only a fraction of a cent per shingle. You will find your prospect only too glad to give this little in exchange for genuine fire safety.

JOHNS-MANVILLE Incorporated
Madison Avenue at 41st St., New York City
Branches in 56 Large Cities
For Canada: CANADIAN JOHNS-MANVILLE CO., Ltd., Toronto



Flexstone Shingles will not curl because they cannot dry out.

COVERS THE CONTINENT
Through
Asbestos
and its allied products
INSULATION
BRAKE LININGS
ROOFINGS
PACKINGS
CEMENTS
FIRE PREVENTION PRODUCTS

JOHNS-MANVILLE Asbestos Shingles

Buyers' Guide for Builders

What Manufacturers of Materials, Equipment and Machinery for Building Construction Are Doing for the Industry

Oil Burner That Operates Without Gas

IN an article in NATIONAL BUILDER for September, 1922, the subject of oil burners for furnace installations was discussed and illustrated in some detail. The point was made that installations of oil burners can be successful only in cities or towns where gas and electricity are available, and that the failure of the supply of either one of these will put the oil burners out of commission.

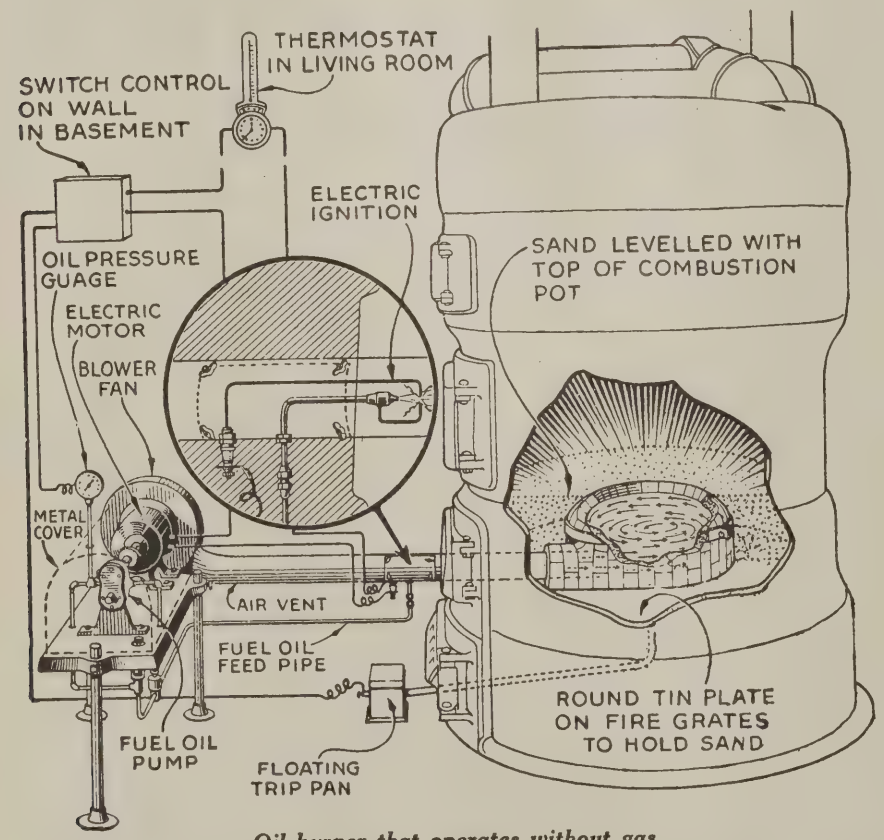
Since that time one manufacturer has devised an oil burner which eliminates the necessity of gas for its successful operation and, therefore, makes it possible for communities where electricity is accessible but gas is not to take advantage of oil burners for house heating purposes. This burner operates on a principle similar to that of an internal combustion engine. Instead of requiring a constant gas pilot flame for igniting the atomized oil, an electrical spark, produced by a simple ignition system, serves the purpose. Details of the mechanism of both the electric, ignition and the burner installation as a whole are shown in the diagram.

Note that the flame itself is confined to the fire pot inside the furnace. It is introduced into the fire pot at a tangent, revolving around of its own velocity, and comes into contact with a refractory material, which assists combustion. A simple, "fool-proof" blower fan mixes air thoroughly with the oil, and insures every drop being entirely consumed, so as to give its full value in heat.

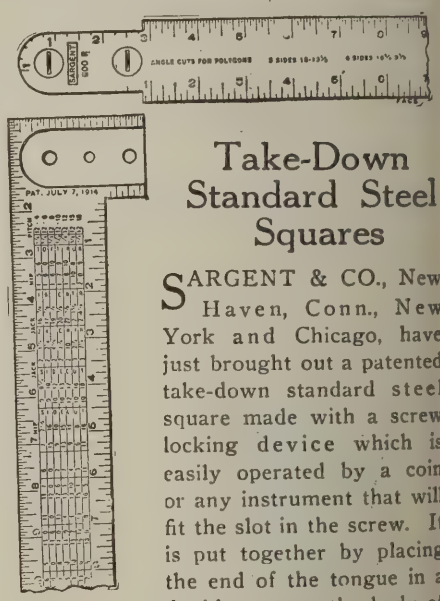
The burner is described as being very simple in its makeup and operation. All mechanical parts are covered; the fan, the motor and the pump for the fuel oil; and the burner takes comparatively little space.

This burner is the product of the American Oil Burner & Boiler Co., 3841 Lincoln Avenue, Chicago, Ill. The manufacturers claim that it will burn fuel oil of the lowest grade; that is, of from 30 to 36 gravity with a calorific value of 18,500 B.t.u., and therefore costs considerably less than kerosene; also that one of the most important objections to the earlier oil burners, namely, the roar which it produces when in operation, has been eliminated in their burner.

Contractors, architects and builders are noticing an increasing interest on the part of the public in the subject of oil burners. The price of coal has, of course, done much to prepare the way for other than coal-burning heating systems. The advantages of the oil burner, however, so it is claimed, are not so much in its fuel economy as in the fact that it eliminates practically all work connected with the care of the furnace. There are no ashes to take out, no coal to shovel, and because of the thermostatic control the furnace regulates its own heat.



Oil burner that operates without gas



Take-Down Standard Steel Squares

SARGENT & CO., New Haven, Conn., New York and Chicago, have just brought out a patented take-down standard steel square made with a screw locking device which is easily operated by a coin or any instrument that will fit the slot in the screw. It is put together by placing the end of the tongue in a double seat on the body of the square and is held together by two self-contained binding screws. A dowel pin, located between the two screws, insures keeping alignment. There is a slight clearance between the body and tongue when locked which will take up any slight wear and the screws are case-hardened to withstand hard usage. The square can be taken apart easily even if rusty, as the tongue lifts out of the seat in the body when the screws are loosened. There are no parts to lose, as the screws are self contained. It is made in a body size 24x2, tongue 16x1¼ and on the square is contained information needed for: Brace measure, patent rafter table, table for hip, valley, jack and cripple rafter, table of cuts for polygons. It is made in plain steel, also blued with white enamel figures and marks, also royal copper finish.

The Architect and Owner Have Specified Oak Floors

Your part of the job

is to lay them properly. An oak floor, when well laid, will last indefinitely, and give satisfaction to generations of users under the most exacting conditions. As a craftsman, proud of your handiwork, you can further "better building" in homes, apartments, offices, schools—wherever you lay oak floors.

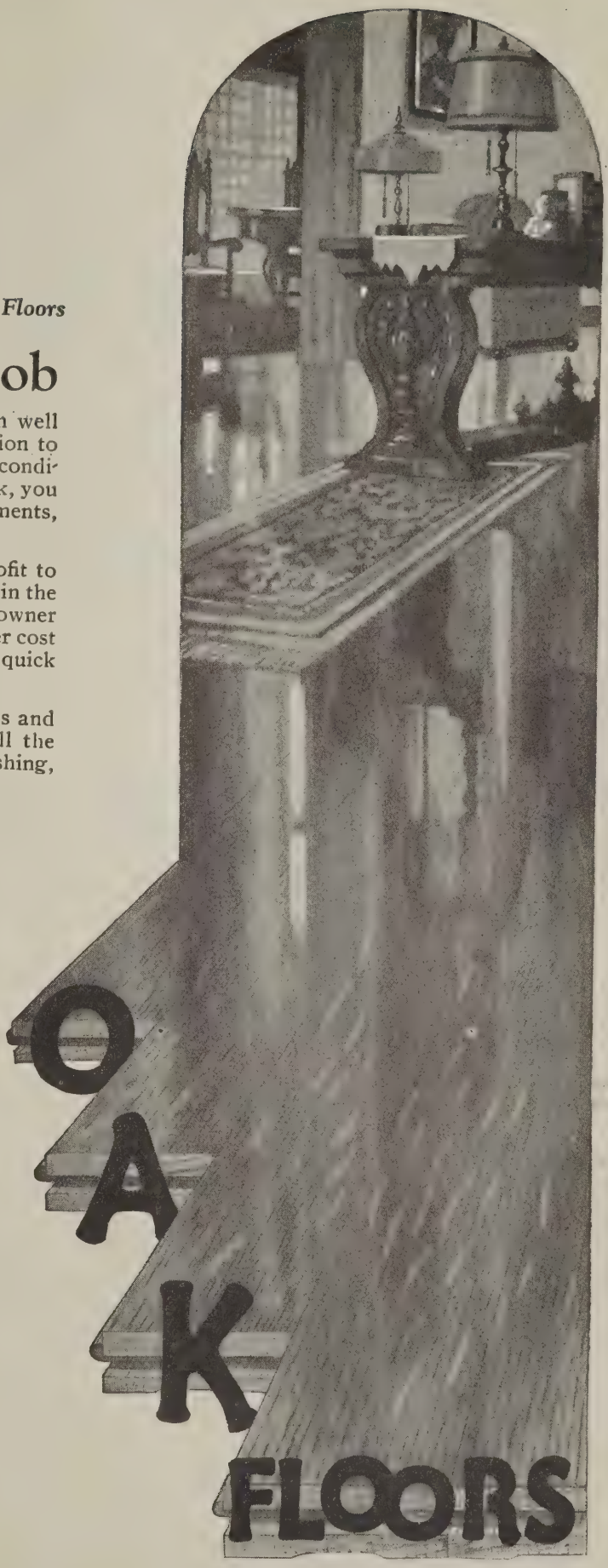
Don't overlook the possibilities for extra profit to yourself in laying 3/8-in. over old worn floors in the homes in your neighborhood. Explain to the owner how he can improve his property at no greater cost than the price of new carpets. His wife will be quick to see the saving in her house work.

Write for our three free booklets on the uses and advantages of oak flooring. They contain all the information about grades, laying and finishing, necessary for your purpose. Write today.

OAK FLOORING BUREAU
1045 Ashland Block Chicago

Laying a sound and fire-proof floor in a modern apartment building

Put your flooring problems up to our experienced flooring experts. We will gladly serve you

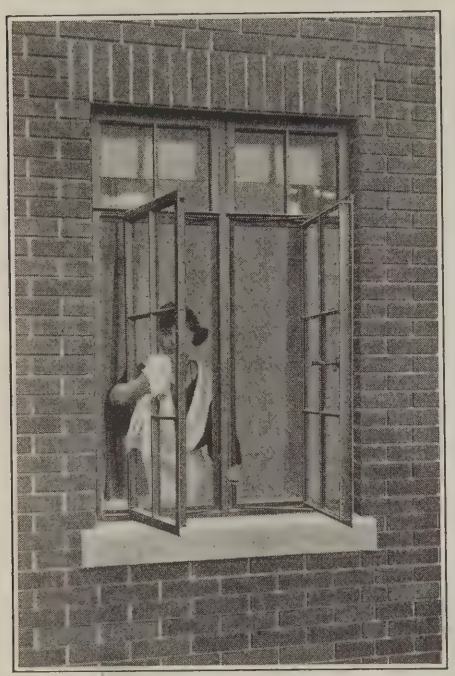


FOR EVERLASTING ECONOMY

"Projected" "Out-at-Side" Windows Have Many Advantages

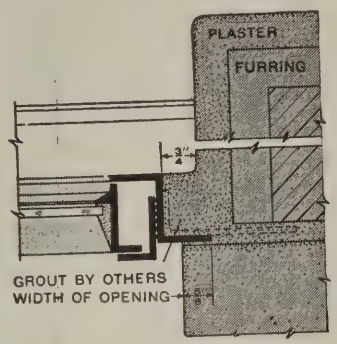
IN the minds of a great many builders there is no other window that is so desirable as the casement. The casement permits 100 per cent use of the window opening, and when it is divided into small panes it is in keeping with the architectural scale of the average small house and prevents the window, when open, from appearing a big black hole in the wall. When the sash are of steel, their slender, purposeful lines suggest light and air and freedom. Omission of box-like framing results in a large light-giving area and in bright, sunny rooms.

But steel windows of casement pattern have till recently been purchasable only



The sash are not hinged but are held top and bottom by pins sliding in grooves

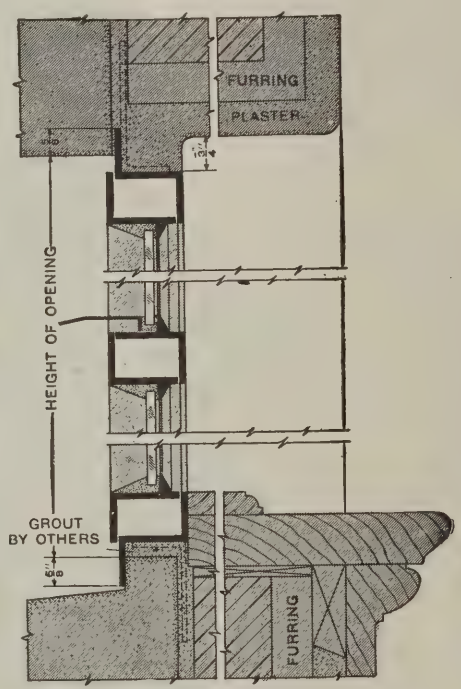
in heavy construction for costly residences and for banks, libraries and monumental buildings. No such windows suited in size and price to the small home have been available. There are now, however, several good types of steel casement windows on the market which are suitable for small house construction. Those manufactured by David Lupton's Sons Co., Philadelphia, Pa., are of particular interest. They are called "Projected" "Out-at Side" windows. The illustrations show how they operate and the construction details. The ventilator (movable portion) is held at top and bottom by arms having their ends pivoted to the window and the frame. One side swings outward in the usual manner. The other side moves laterally a few inches, its top and bottom corners being guided in the frame. By means of friction shoes backed by springs and sliding in brass guides, the ventilator is held steady at any degree of opening. The frictional control prevents rattle. As the ventilators are steadied at both top



"Out-at-side" window in brick jamb. Dotted lines show wall ties used to anchor window in jamb

and bottom—instead of only at the bottom like hinged casements—there is no tendency, it is claimed, for them to rack. When the ventilators are fully open, the outer surface of the glass can be reached for cleaning without the usual inconveniences and risks.

The only hardware is a drop-forged cam latch. This latch gives, besides the "shut" position, two others—½ in. and 1 in. open



Head shows brick wall stone faced. Note reveal formed by plaster

—for winter ventilation. An important feature claimed for all Lupton windows is the width of the frame member flanges. These members are substantial Z or T-bars, whose flanges enter the jambs and lintels to a depth of ⅝ in. This is ample, it is stated, to insure an air-tight and water-tight bearing in the wood or masonry. Nominal sizes of the windows are taken to arbitrary measuring lines ⅝ in. inside the outside edges of the frames. The nominal sizes are therefore equal to the opening sizes for single openings. For multiple openings, ½ in. is added to width for each mullion. The sash must always be anchored at the sill, using standard wall ties furnished with sash. These are set in brick or masonry joints or imbedded in concrete sills. They may be omitted with wood sills, and the sash screwed directly to the sills. It is essential that free drainage be provided outside from the bottom edge of the frame. Unless this is done, water will be retained and corrosion will follow.

With these windows, it is explained, there is no necessity for using wood trim above the sill; its omission is architecturally correct as the photograph shows, and considerable expense is thereby saved, both in first cost and in later maintenance. The detail illustration shows how the inside plaster is carried up to the frame. Standard Lupton "projected" windows, "out-at-side," are carried in warehouse stock at the factory. This insures delivery in ample time when the order is placed before the foundation is started.

New Fox Floor Scraper

WITH ten years' experience in the manufacture of floor scrapers and floor scraper blades, the Fox Supply Co., Brooklyn, Wis., are now putting on the market the Fox No. 4 Floor Scraper, shown in the accompanying illustration. This scraper is

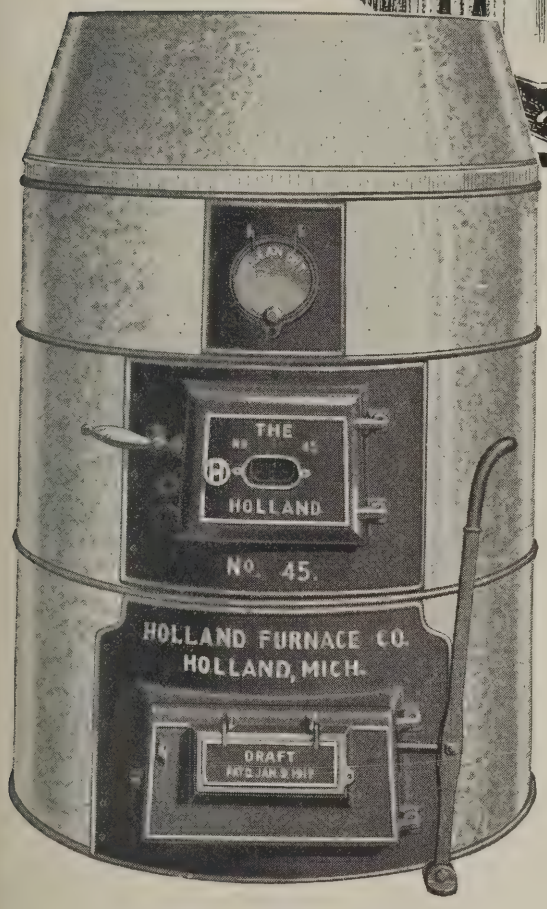
New floor scraper. Frame is of gray iron carried on two rubber-tired wheels. Handle is adjustable in height

of few parts, and the simplicity of its construction makes possible a very attractive price.

The body of the scraper, it is claimed, slides on the floor like a plane, insuring a cut of uniform depth. The bottom of the scraper is planed and corrugated, to avoid any possibility of suction and to make it easier for the operator. A rubber cushion lies directly over the blade, so as to take up all vibration and prevent chattering when

This Year's Profits Go to the Builder Who Makes Speed

"Oh Daddy, now it feels good just to breathe in our house."



Holland Furnaces Make Warm Friends

You who build—have you ever stopped to figure how many more homes you could turn in a year if you would just call in the Holland man?

The Holland man comes in—engineers the job, tells you the price, installs the right furnace without damage to walls or decorations, puts everything in shape ready to operate, and hands you a transferable Holland Bond that says, in substance—"we take all responsibility." We guarantee the Holland will operate economically, successfully and satisfactorily, and the customer knows the worth of the Holland Bond, accepting it both as evidence of the quality of the entire home and as evidence of the builder's trustworthy business methods.

Ask for details—learn how moderate the prices of Holland Systems are in spite of Holland superiority.

HOLLAND FURNACE COMPANY

World's Largest Installers of Furnaces

General Office: HOLLAND, MICHIGAN **Two Factories: Holland, Michigan, and Cedar Rapids, Iowa**

Central Chicago Office: Building Material Exhibit, 6th Floor, Leiter Bldg., 15 East Van Buren Street

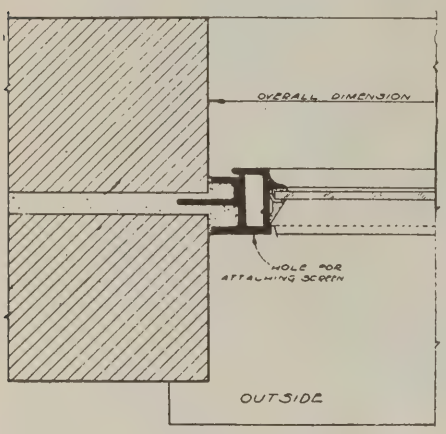
scraping hard and cross grain flooring.

A very interesting folder on resharpening floor scraper blades is mailed upon request by the Fox Supply Co., Department "A," Brooklyn, Wis.

The Fox No. 4 floor scraper weighs 100 lb. and is one of five sizes made by this concern.

New Jamb Detail for Steel Basement Windows

BUILDERS and real estate men realize that it is the "fine points in house equipment" that help sell the newly built house

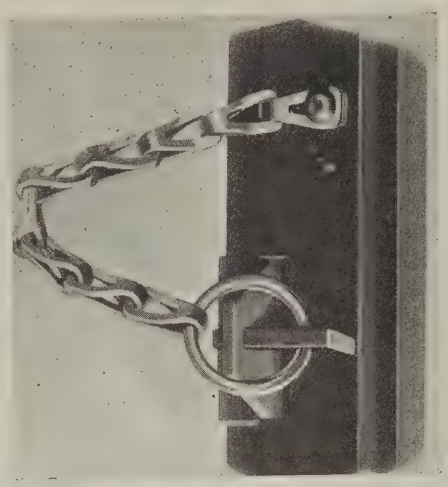


Detail No. 1

to the prospective home owner. The fact that steel basement windows have come to be considered one of the "fine points" is clearly demonstrated by the rapidly increasing popularity with which they have been received by architects and builders.

A new jamb detail and a "self centering" lock has recently been incorporated in the design of Fenestra steel basement windows, manufactured by the Detroit Steel Products Co., Detroit, Mich. These two improvements will be of interest to contractors and builders.

It is not necessary for the mason to plumb the jamb when a window with this new jamb detail is used. An extending fin between the two channel legs acts as a guide for the mason when laying up the inside and the outside of the brick wall. The extending fin set into the wall at the jamb secures solid anchorage. The two channel legs, against which the bricks are laid, prevent the mason from building the wall so close to the ventilator as to bind it, as shown in detail No. 1.



Detail No. 2—A self-centering lock holds the ventilator in place

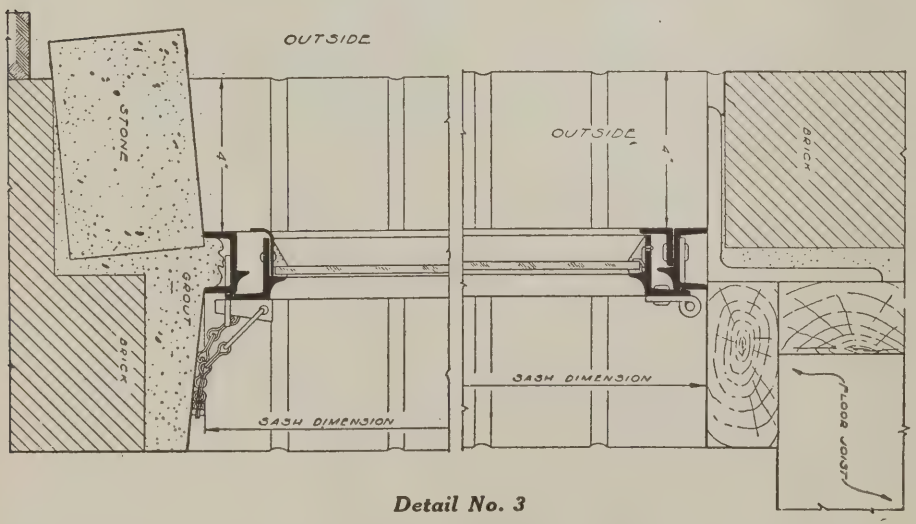
The advantages of the "self centering" lock will be evident to the contractor and builder upon even a casual examination. A slotted bracket, with tapering edges, solidly riveted to the frame at the sill, guides the sash as it closes and makes it seat accurately. This "self centering" lock holds the ventilator in place and assures the builder that the window will center accurately when installed. Details of the lock are shown in the accompanying photograph.

A vertical section of the head and sill members installed in brick is shown in detail No. 3. Notice that the frame at the head is an equal channel. When filled with mortar, this provides a weather-tight bond between the frame and the plate or bond timber or other construction, which supports the floor joists.

The hinges are placed low enough below the edge of the channel leg at the head to prevent them from being fouled by the plate or bond timber above them. This assures an easily operating sash.

The frame at the sill is also an equal channel. It acts as an even base on which the window stands upright. No bracing is necessary. Merely set the window in a bed of mortar and lay up the wall around it.

SILL HEAD IN BRICK VENEER

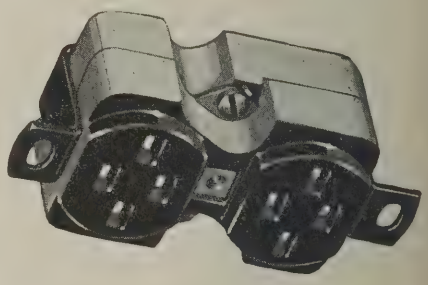


Detail No. 3

Duplex Convenience Outlet

THE Square D Co., Detroit, Mich., is marketing a new convenience outlet that has created a very favorable impression. The new outlet presents a pleasing appearance and embodies several unique features.

The terminal and four jaws are made of one piece of metal. This avoids connecting screws and poor contact, it is claimed, and it eliminates the need for sealing wax in the outlet, since all current carrying parts are enclosed by the two pieces of porcelain. The jaws are the Square D multi-spring type with contact on both sides of the inserted blade, so that perfect contact is assured. Because of the multi-spring design, they will adjust themselves to variations in the spacing or thickness of the blades.



Detail No. 2

The current carrying parts are made of heavy Coe bronze, noted for its spring quality. The rating of each outlet is 10 amperes, 250 volts, but the heavy current carrying parts permit a current of 20 amperes without heating. The terminal screws are very accessible. They are long, flat headed, grooved and clinched at the end, so that they cannot fall out. The outlet is thin and can be used with the shallow type outlet boxes, leaving ample wiring space. The face of the outlet is a highly glazed black porcelain, which contrasts pleasantly with the brushed bronze plate. The duplex outlet is packed in individual packages, 10 to a carton and 100 to a standard package.

This Carpenter Makes $35.00 to $45.00 per Day

E. A. Smith
803 W. Walnut St., West Frankfort, Ill.

HERE is a man in Illinois who followed the carpenter trade forty years. Eight dollars a day was the scale paid when Smith quit the job. That wasn't enough so he decided to get into something for himself. He heard of the "American Universal" electrically driven floor surfacing machine. Having scraped many floors by hand, he realized what an awfully hard job it was and knew that an "American Universal" machine taking this back-breaking work off of fellow-workmen would be welcomed everywhere. He grasped the possibilities, as a carpenter familiar with the building game, of making big money surfacing floors with this machine.

Here is what Mr. Smith says after buying the machine and going into the floor surfacing business for himself:

"The machine I bought from you more than a year ago has paid for itself twenty-five to thirty times and I am well pleased with it.

It has advanced my wages about four times over what I used to make as a carpenter. I now make $35.00 to $45.00 per day and some days more.

I have tried four other machines and could have bought them for half what I paid for the "American Universal," but it is always cheapest to buy the better machine.

I will soon be ready for another machine. I make a practice of doing perfect work, the best on the market."

The "American Universal" is made in Toledo by The American Floor Surfacing Machine Company, 519 South St. Clair Street, who advertise every month in this magazine. For further particulars regarding this money-making machine, see their advertisement on page 87 of this issue. —Adv.

Penetrating Oil Stains

bring out the figure of selected door veneers and wood trim lumber in their full beauty.

To medium grade unselected lumber they bring an attractive tone and color ordinarily impossible to achieve.

We are one of the oldest established manufacturers of aniline stains, wood filler and varnish in the country, and have been catering to the most discriminating contractors, builders and architects for years.

A Free Set of Panels

As a part of our service we offer a full set of panels showing various current shades of

Oak
Walnut
Red Mahogany
Brown Mahogany
on Birch, Gum, Cypress, Pine, etc.

We make these up for our clients—you have only to describe your wants.

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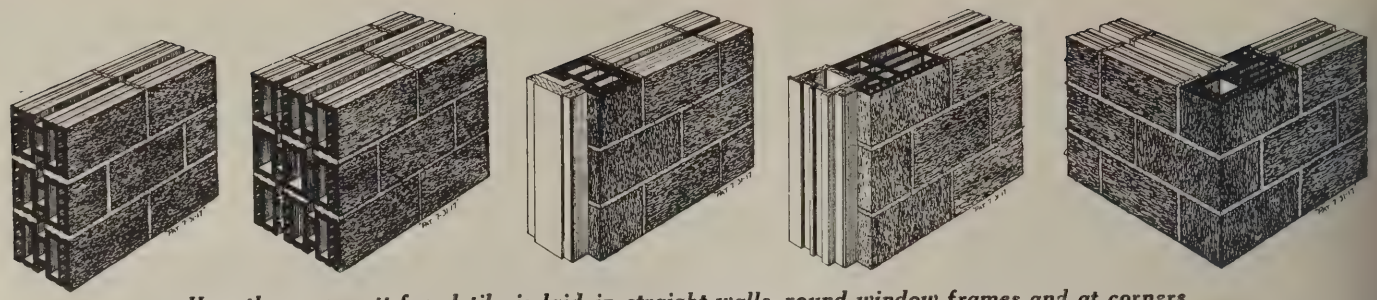
Please send us information and literature for our files on the following:

- ☐ Ad-el-ite Stains
- ☐ Ad-el-ite Varnishes
- ☐ Naples Velvet Flat Wall Finish
- ☐ Hygienic Kalsomine
- ☐ Ripolin—The Original Holland Enamel Paint
- ☐ Ad-el-ite Creosote Shingle Stain

(Please specify whether builder, architect, etc.)



How the new matt-faced tile is laid in straight walls, round window frames and at corners

New Matt-Faced Tile

A NEW kind of hollow building tile was used in the construction of the house shown in the accompanying illustration. It is the product of the Mason City Brick and Tile Co., Mason City, Iowa, and is called their Matt-Faced Tile No. 230. It is made in units 5 in. high (or the equivalent of two bricks and a mortar joint), 8 in. thick and 12 in. long. A unit 3⅝-in. high, or the equivalent of 1½ bricks in height, giving the exposed face the same proportion as standard bricks, making a very attractive wall, is also manufactured. It is also 8 in. thick and 12 in. long.

House in Mason City, Iowa, built of new matt-faced tile

A New Flooring—Easily Repaired

FLOORS are of two parts, the wearing surface and the body. The wearing surface of floors and coverings is only that slight thickness which may be worn away without causing the surface to become undesirable, rough and uneven, or to dust, splinter, etc. When this occurs there is a heavy loss from depreciation, because the worn surface cannot be replaced without replacing the entire body or thickness of the floor.

Repair or patching of such floors or coverings is inconvenient and costly. Generally it prevents the use of the space for some period, and mostly costs more than the original installation. It often results in a patched and unsightly appearance of the whole floor. The wearing surface of most floors and coverings of this kind is such a small part of the entire thickness that the greater part of the body is lost when only a small part, generally of the surface alone, is worn away.

"Duraflex" is a new flooring which its manufacturers claim, is not only easily and inexpensively laid, but which greatly simplifies the replacing and repairing of worn parts. The manufacturers are the Duraflex Co., Continental Bldg., Baltimore, Md.

This flooring is of the nature of rubber and is applied as a cold paste about the thickness of linoleum. It is solidly cemented to and is practically an integral part of the under floor, it is claimed.

The makers state that the composition is not affected by water, weather, acids or alkalies; that it will not rot, disintegrate, crack or crumble, and that it maintains its condition indefinitely. Its rubberyness or ductility makes it self-healing. Dents or marks smooth themselves out under traffic. When patched or resurfaced, the new material dissolves the surface of the old and forms a perfect weld. It can be repaired equal to new, as and where worn or damaged, for the life of the building, it is said.

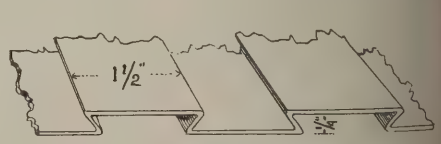
The manufacturers state: "The surface of the old Duraflex need only be dry and broom cleaned. No cutting, roughing or chipping is necessary. A layer of new material in the form of a cold paste is simply applied over the old surface with a trowel. It should be allowed to set over night.

"Because the worn or damaged part can always be resurfaced or repaired equal to new, no part of the material ever has to be thrown away or discarded because a part of it is undesirable. It is all wearing material and is only replaced as and where worn or damaged to restore it to its original condition.

"Duraflex can be applied over new or old floors of cement, composition, steel, wood, etc. In most cases worn floors can be recovered and provided with a permanent wearing surface of Duraflex more economically and to greater advantage than by removing and replacing the worn floor. It gives a warm, resilient, dustless floor in the form of a continuous, seamless sheet of artificial rubber, pleasing in appearance, pleasant under foot and easy to clean."

Dovetail Metal Lath

NATIONAL BUILDER is in receipt from John H. Forster, Glendale, W. Va., of a sample of "Dovetail" metal lath, which



Dovetail metal lath

he states is to be manufactured by McMahon Bros. of his city. It is pressed from continuous metal sheets in the form illustrated.

The Only Journal Devoted Exclusively to the Contractor-Architect and Builder

National Builder

Serving the Building Industry Since 1864

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June 1923

BERMICO SHEATHING PAPER

Bermico is adding comfort to thousands of good homes.

It is a perfect insulation against all kinds of weather, keeping the home cool in summer and warm in winter. Durability is assured because it is made of pure Canadian and New England Spruce sized with rosin.

Manufactured by

BROWN COMPANY

Portland, Maine

New York Chicago

NIBROC KRAFT
THE WRAPPING PAPER

NIBROC TOWELS
ONE WIPES DRY

Showing how the bedroom with AiR-Way equipped windows may quickly be converted into an airy sleeping porch.

Sunshine by Day— Fresh Air by Night

By day the bedroom with *AiR-Way* equipped windows is flooded with healthful sunshine. At night it instantly becomes a private sleeping porch.

AiR-Way will be appreciated by those who want plenty of outdoor air on winter nights, yet like the warmth and comfort of the ordinary bedroom up to the moment of going to bed. In summer the bedroom with *AiR-Way Multifold* windows is comfortably cool on even the hottest nights.

Don't think of building or remodeling another house without first investigating the many advantages of AiR-Way hardware. Write today for your copy of Catalog H-4, which tells all about it.

Multifold Window Hardware

AiR-Way equipped windows slide and fold inside, completely out of the way. They are easy to operate—no interference with screens or drapes, and are absolutely weather-tight and rattle-proof when closed. *AiR-Way* windows may be only partially opened, for ventilation, at any point desired.

AiR-Way provides the most perfect enclosure for sun rooms and sleeping porches. It also is ideal for bedrooms, living rooms, dining rooms and kitchens. Old-fashioned double-hung windows may easily be replaced with *AiR-Way*.

Most hardware and lumber dealers carry AiR-Way hardware in stock. If not, they will order it for you from our nearest branch. Remember, there is no substitute for AiR-Way

New York
Boston
Philadelphia
Cleveland
Indianapolis
St. Louis

Richards-Wilcox Mfg. Co.
"A Hanger for any Door that Slides."
AURORA, ILLINOIS, U.S.A.
RICHARDS-WILCOX CANADIAN CO., LTD.
Winnipeg LONDON, ONT. Montreal

Chicago
Minneapolis
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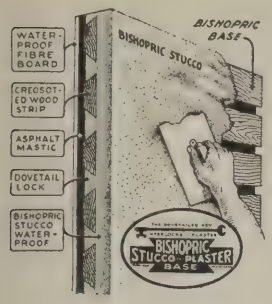

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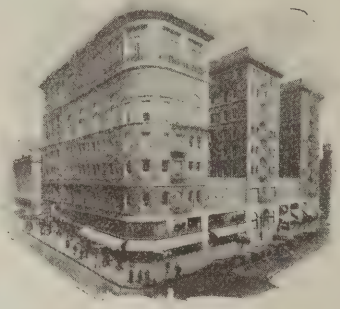
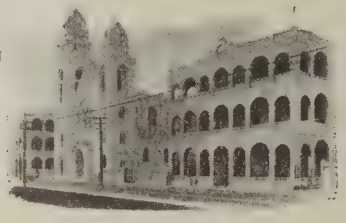


For hotels and office buildings

For residences



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NATIONAL BUILDER

Volume 66 CHICAGO, JUNE, 1923 Number 6

Summer Resort Construction

Illustrating Common Practice Relative to the Construction of Log Buildings

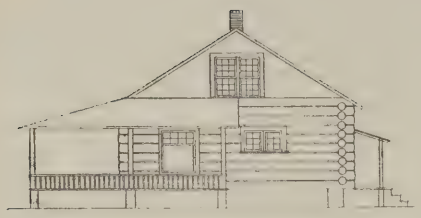
A TYPE of construction which is somewhat unfamiliar to the contractor who deals with ordinary residence or industrial work is that form of building known as "summer resort construction." Summer resort buildings, constructed of frame, are generally very light structures and little need be said about their details in connection with this article except that they differ from any other ordinary type of house construction only in that they are lighter and somewhat less substantially constructed than a house in the city. This does not mean that "shoddy" construction enters into the erection of a summer resort building. The ordinary summer resort is in operation only for a few months in the year when the weather is generally pleasant and warm, and since little or no protection is required against the cold and because a heavily built summer resort cottage affords no more convenience than one of lighter construction, this lighter form of construction, if it be not carried to extremes, may be said to be justified.

At resorts, however, where cold weather is liable to be encountered, a substantially constructed building is necessary. Here then is a problem. In such regions as the north woods, where a great number of summer resorts are located, lumber may be bought at the mills for very reasonable prices, since it is not necessary to add freight charges. This is all very well, but since the resorts are generally located on lakes, which are more or less isolated, and since, in the spring, when the resorts are being made ready for the summer vacationists, the roads are in very bad condition, the fact that lumber may be bought at a mill 10 or 12 miles from the building site loses much of its attractiveness. To haul lumber over 10 or 12 miles of muddy roads makes for a sharp increase in the cost of the lumber when delivered to the job, and so a less expensive form of construction becomes necessary.

Log cabins, built where standing timber abounds on the site, furnish a solution of the material supply problem. Their use as summer resort buildings has a basis in several good reasons. First, is their picturesqueness and their romantic appeal to the summer vacationist who has been cooped up for 11 months in a small city apartment. They create a "woodsy" atmosphere and furnish a diversion to the guests of the resort who are, almost without exception, city people. Second, is the fact that timber for their erection may be taken directly from the site and need be hauled only a short distance on drags or sleds in the winter time when the ground is frozen over. It may be stored on the site without erecting a shelter and is subject to little or no deterioration due to inclement weather. Thus the first and main problem entering into the construction of any building in an isolated spot, the supply and delivery of materials, is solved.

A typical North Woods camp illustrating various types of log buildings

The illustration on this page shows a typical north woods summer resort, with a number of log cabins grouped about a central dining hall. A glance will show that this group of buildings has evidently not been built as a unit, but rather has been developed from year to year, as is the general case, to provide more space as the needs



Side elevation of summer home of W. J. Lawrence. Designed by A. J. St. Louis of Phelps, Wis.

Summer home of W. J. Lawrence at Long Lake, Wis.

became apparent. This is indicated by the variety and type of construction of the different buildings.

In the north woods, where pine abounds, this kind of log is generally used, as it is most easily obtained and weathers well. The logs are taken down in the winter time when the sap has stopped running so that not much seasoning will be required. They are generally dragged over the snow in sleds to the site of the work, where they are cut to length and then peeled with drawknives before being set into the wall. Unpeeled logs are not generally used since the bark affords an excellent abiding place for insects which in time may destroy the log.

Log construction may be separated into two general classes: First, where the wall is formed by laying the logs horizontally, and, second, where the logs are stood vertically and held in place by means of plates and sills. For the first method, where the logs are to be laid horizontally, long, heavy, straight, and only slightly tapered logs of approximately equal diameters may be used if a good wall is desired. It also means considerable labor in chipping the logs where they rest upon each other at the corners. A horizontal log wall, however, is quite rigid and it may also be said in passing that this type of wall is the city dweller's conception of a real log cabin.

The horizontal log wall, however, has several disadvantages which become readily apparent by a study of the requirements for the logs which enter into this kind of building. The time when lumber could be

An example of the possibilities of log porch ornamentation

Power-saw

1½-ton tractor

Concrete mixer

Some equipment used by A. J. St. Louis in constructing Twin Lakes Lodge, a new summer camp at Phelps, Wis.

selected at will to meet any specification is long past and it is necessary now to use what is available rather than what is most desirable.

Vertical log walls offer a way out of the difficulty when the timber supply is not such as will provide suitable logs for the horizontal type of construction. In the vertical wall short logs, equal in length only to the ceiling height, are required. They may range in diameter from 5 to 9 in. without seriously affecting the appearance of the wall, and if they are slightly curved they may be turned on their vertical axis until the straight portion is in the outside face of the wall. A vertical log wall is constructed by cutting the log to the desired length, toe-nailing the bottom end to a heavy sill, and nailing the upper end to a 2x6 plate. The lower sill is generally a heavy log trimmed to about 8x8 in. and is supported on concrete piers 1 ft. sq. Logs over window openings are supported by heavy wood lintels, generally 4x6 in.

In the large dining halls where a maximum of unobstructed floor space is required it may be obtained by using long, heavy log girders into which frame lighter poles which serve the purpose of joists or else a form of log truss-work may be used. Some framing details are shown in the accompanying illustrations. An interesting framing detail is shown on the last page of this article. It illustrates the method used in supporting the roof over a porch which

Peeled logs and floor joists for the dining hall

Foundations for the dining hall

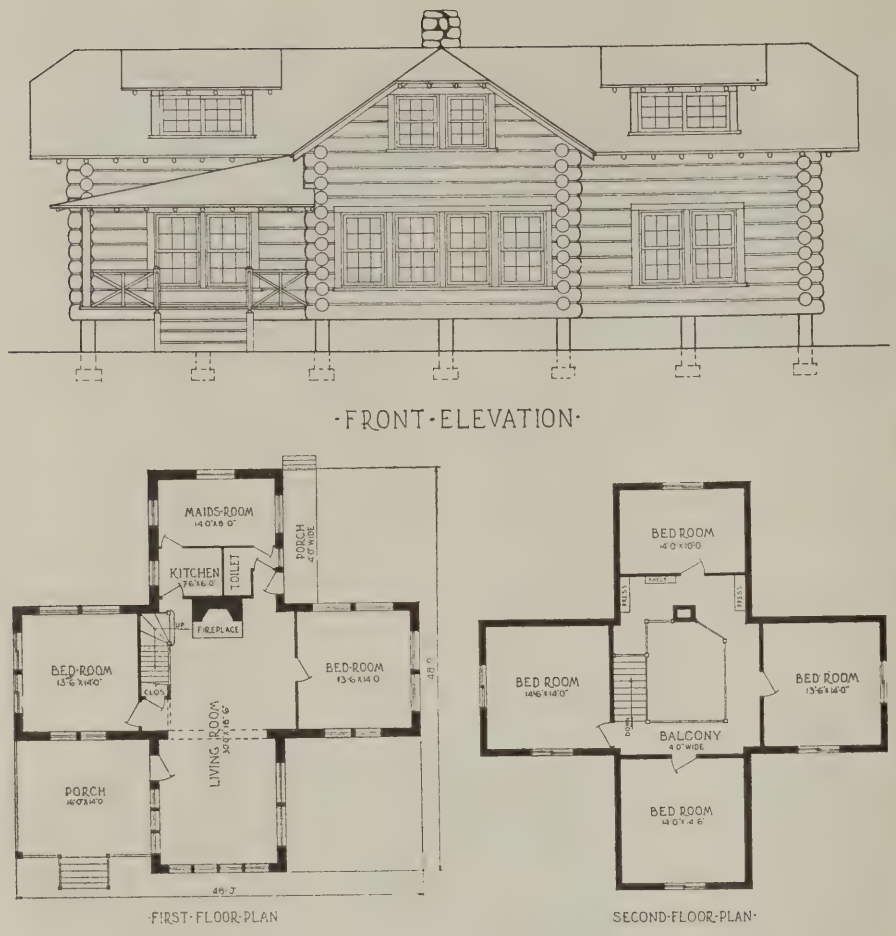
Scenes at the site for a new dining hall at Twin Lakes Lodge, Phelps, Wis.

Finished joint

Flush joint

Raked joint

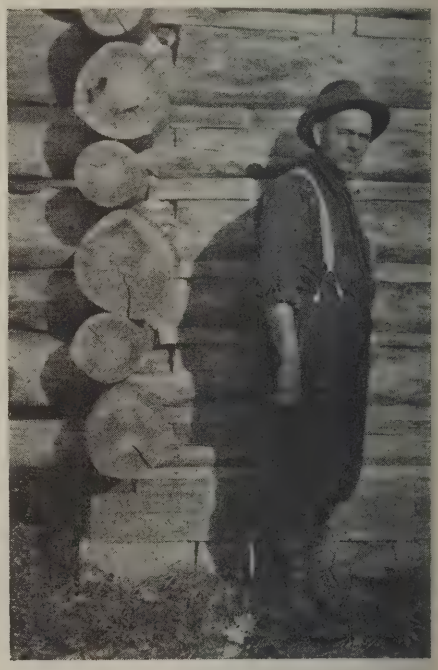
Three examples illustrating the effect of using different exterior mortar joints in field-stone chimneys



Front elevation and floor plans for log house designed by A. J. St. Louis

provided a view over the lake. Large heavy log columns and girders would have blocked the outlook, but by the use of heavy pipe, an unobstructed view was provided. Note that the joists are held in place by notches which rest on the pipe. Credit for this idea, as well as many others given here, is due to A. J. St. Louis, of Phelps, Wis., a builder who has specialized in log work for many years and who has built the majority of the log buildings in the vicinity of Phelps.

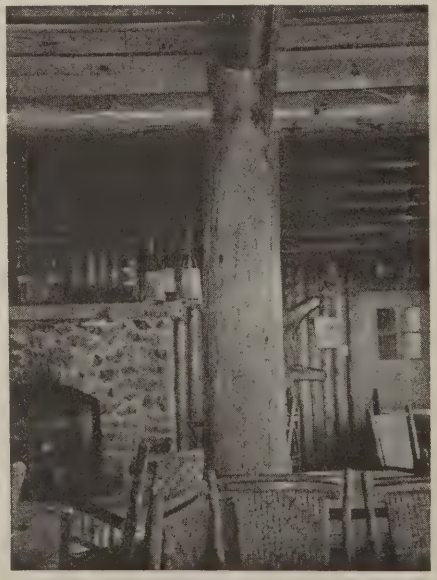
Much of the weather-tightness of a log building depends entirely upon the manner in which the openings between the logs are filled. The openings may be stopped with quarter-round, with mortar, with oakum or by planing the faces of the logs so that they fit tight. This last method is very expensive and is hardly to be recommended. Quarter-round provides a satisfactory wind stop and so does mortar, but from the experience of Mr. St. Louis it would seem that oakum, from the standpoint of both utility and economy, is best suited to this purpose. The oakum should not be driven into the cracks between the logs until the logs have been standing in place long enough to be



A. J. St. Louis, designer and builder of log houses

partially seasoned. If oakum is placed before the logs have had a chance to dry out it will be necessary to drive the oakum a second time when the crack widens, due to the seasoning of the log. When mortar is used nails should be partly driven into the logs at the joints so that the tops stick out

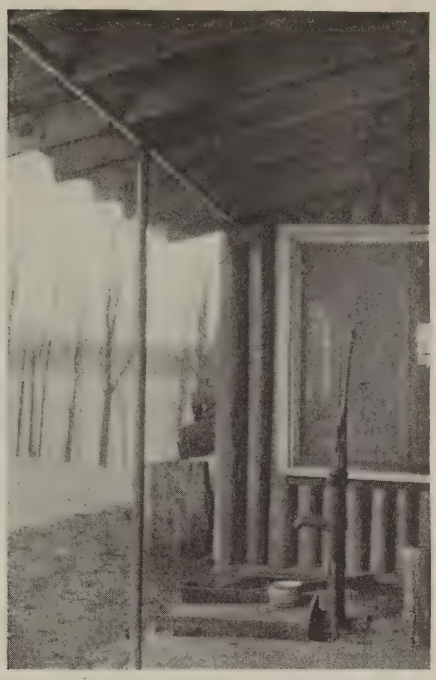
Method of supporting second floor girders



View showing girders framing into column

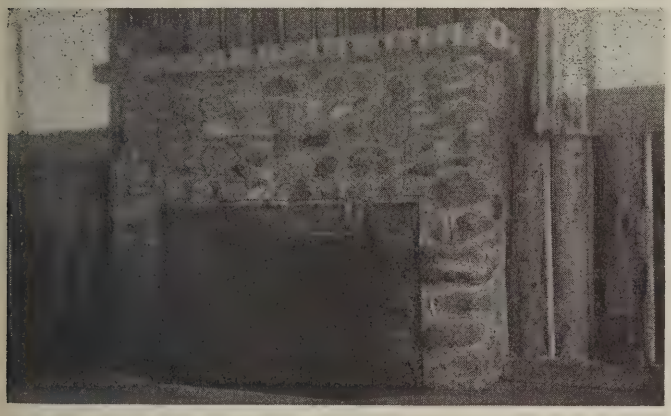
A corner in a log cabin. Note ceiling construction

Corner in bathroom. Note hot-water heater



Pipe column to provide unobstructed view from porch

Exterior of chimney built of field stone



Stone fireplace in cabin shown at top of page

A log cabin built with logs stood on end

for about an inch or an inch and a half above the logs. These projecting nails serve to hold the mortar to the joint and to prevent its chipping off due to weathering.

For fireplaces and chimneys field stone is

Four ways of stopping cracks in walls of log cabins: 1—logs planed; 2—quarter-round between logs; 3—mortar between logs; 4—oakum between logs

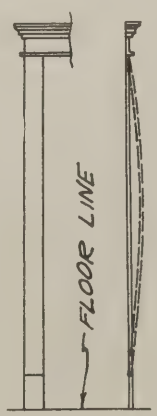
generally used. This stone is gathered at the site and is laid up in cement-lime mortar. Different effects may be obtained by the use of various types of joints. The chimneys are generally lined with one thickness of firebrick laid in fire clay to provide good draft. Interior log work is generally varnished to prevent discoloration due to seasoning. The best time to apply the varnish is after the logs are partially dried out.

Besides the details noted, many bits of ornamental work may be added to increase the attractiveness of the camp. An illustration of some good ornamental porch detailing is shown on the second page. In this case the logs are unpeeled.

It has been said that the construction of a log building is a shameful waste of lumber due to the fact that so much more timber is used in the walls than in the walls of an ordinary frame building, but where hauling costs make the price of dimension lumber prohibitive there is another side to the question. It must be admitted also that nothing is so productive of the atmosphere of the woods as a real log cabin, and that, as regards log buildings, there are other things to be considered aside from the amount of timber entering into their construction.

To Fit Casing

WHEN fitting door or window casings a good method is to cut the casing just a trifle larger than the space it is to occupy. Spring it into place as shown in the figure and then nail it. By setting a casing in this manner a good fit is assured and the casing is not liable to open up.



Inasmuch as the casing is cut a trifle longer than the space it is to occupy a certain amount of contraction, due to the casing drying out, may take place before a crack begins to appear. The excess length required to give the casing a "spring" is generally enough to take care of the contraction due to seasoning.

Acme of Apartment House Service Equipment

Waldman Apartment House, Denver, Colo., Has Mail Chute, Electric Laundry, Dish-Washing Service, Vapor Heating, Safety Deposit and Fur Storage Vaults, Grocery Store and Market, "and Everything"

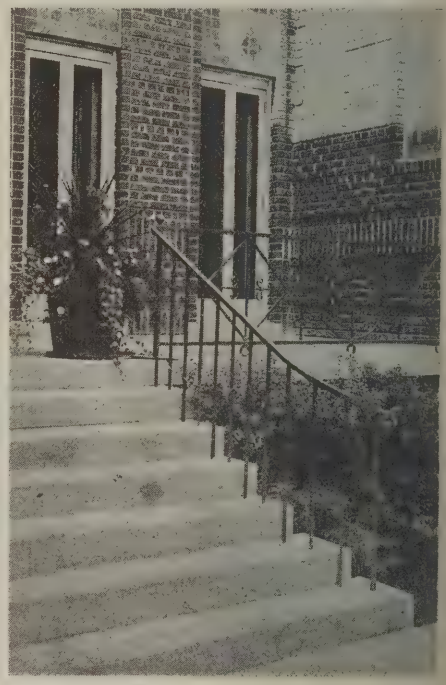
THE Waldman Apartments, 14th Avenue and Pennsylvania Street, Denver, was erected for a man who for years had studied how best to serve the public and has prospered thereby—D. M. Waldman, veteran restaurant operator. Mr. Waldman wanted an apartment house which would carry service to tenants to the farthest point practicable. He retained as architects Messrs, Fisher and Fisher, of Denver, who prepared plans which included all the refinements of service which their client desired. Since completion, the Waldman Apartments has been sold by Mr. Waldman to the Hon. Oliver H. Shoup, governor of Colorado, who bought for investment.

Entrance detail, Waldman Apartments

The Waldman apartment house is of reinforced-concrete construction, fireproof. The exterior is of brown Rug brick, with cream motar joints and terra cotta trimmings. The building is in the form of an "H." All apartments—there are fourteen on each of the three floors—have outside windows. The building is so designed that its height can be increased later to seven stories.

Through an ornamental gateway, the visitor enters a fore court with fountain, passes up a flight of stairs to a terrace, and thence into a spacious lobby. This lobby, which has alcoves at either end, is 36 ft. by 15 ft. The alcoves are 8 ft. 2 in. by 15 ft. The lobby is attractively furnished, and makes a convenient and tasteful meeting place.

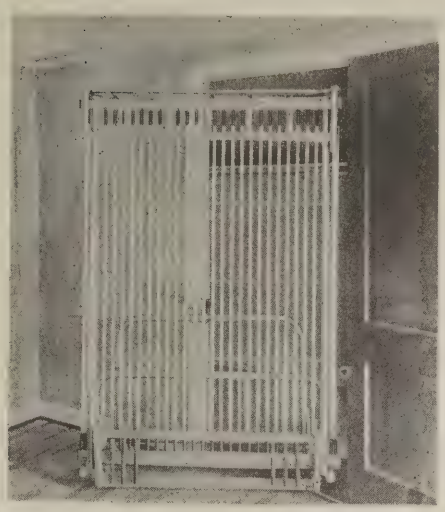
The court was featured by wrought-iron work, including balconies, paling around terrace, grill in door, etc. The builder was fortunate, to the extent that Denver has an iron worker, Burkhart, South Broadway, who produces a grade of workmanship impossible to obtain locally in many places. The general idea followed for the Waldman Apartments was an



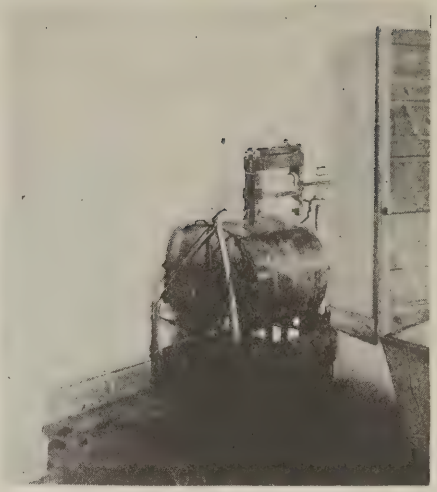
Wrought-iron railing detail

Waldman Apartments, Denver, Colo.; perhaps the most completely equipped apartment house in the world

Storage vault of reinforced concrete; fireproof steel door



Murphy closet bed, 52-in.



Electric washer

adaptation of the old English gateway, with lanterns.

Opposite the lobby are two elevators by which upper floors are reached, also the servants' stairway. Several steps on either side here, then a corridor, lead to first floor apartments.

A 6-in. terrazzo base beneath floors, with sanitary cove, was used in the building. Terrazzo also featured the main lobby. The Venetian Terrazzo and Mosaic Co., Denver, supplied the terrazzo.

Corner apartments consist of five rooms

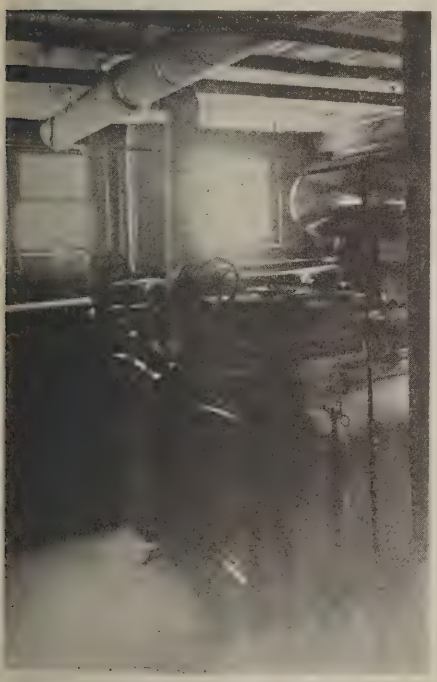
phy in-a-door bed is brought to convert the living room into a sleeping room. The living room is approximately 12 ft. by 19 ft. Corner apartments have a living room 12 ft. 6 in. by 17 ft. 6 in. The bedroom is 12 by 10 ft.

Sanitary moldings are incorporated throughout. Hall floors are terrazzo. All walls are painted. Upper floors have mail chutes, such as office buildings have. All apartments have telephone service.

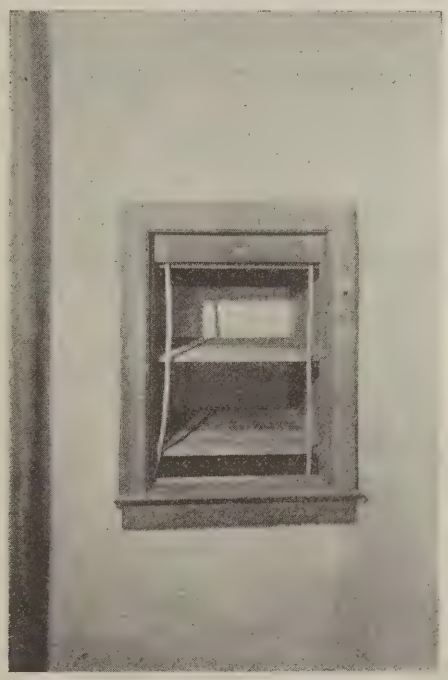
This is the first apartment house in Denver to have mail chutes. The mail box is in the main lobby, receiving also

waiters, each serving two apartments. They are of the improved self-locking type, manufactured by Kimball Brothers Co., Council Bluffs, Iowa, holding in position wherever stopped with automatic safety devices. Each is of 200 lb. capacity. Wood was chosen in preference to the steel type. All shafting is of steel, and all bearings fitted with steel anti-friction rollers.

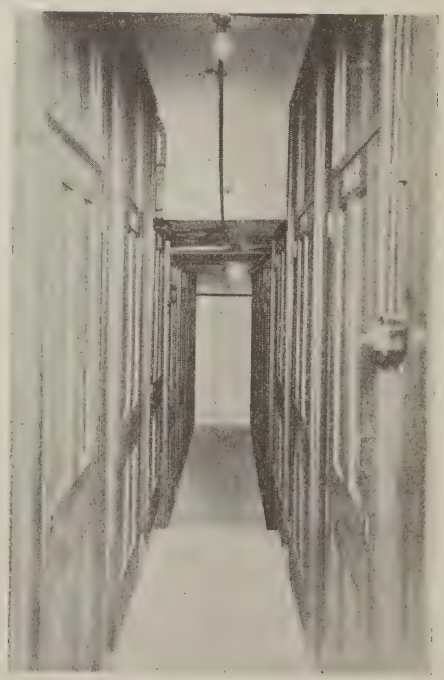
The Otis elevator is of push button type, moderate speed, equipped with all standard safeties. The momentary pressing of a button brings the car opposite



Vapor heating system



Kimball self-locking dumbwaiter



Storage lockers in basement

each—living room, breakfast room, kitchen, bedroom, sleeping porch, also bath. All baths in the house, by the way, have both tub and shower. Aside from corners, apartments do not have a bedroom nor a sleeping porch. A substitute provision is a large dressing room, from which a Mur-

mail deposited on the other floors. The installation was designed and done by August Friedrichs, of Denver, and is a special design in bronze, harmonizing with the building. The name plate of the apartment house appears on the box.

The house was equipped with ten dumb

the landing at which the button is pressed, unless the elevator is in use. Operation from the car is obtained by pushing one of a series of buttons, which sends the car to the landing designated, where it automatically stops. A safety stop button is provided, which will stop the car when-

ever momentarily pressed.

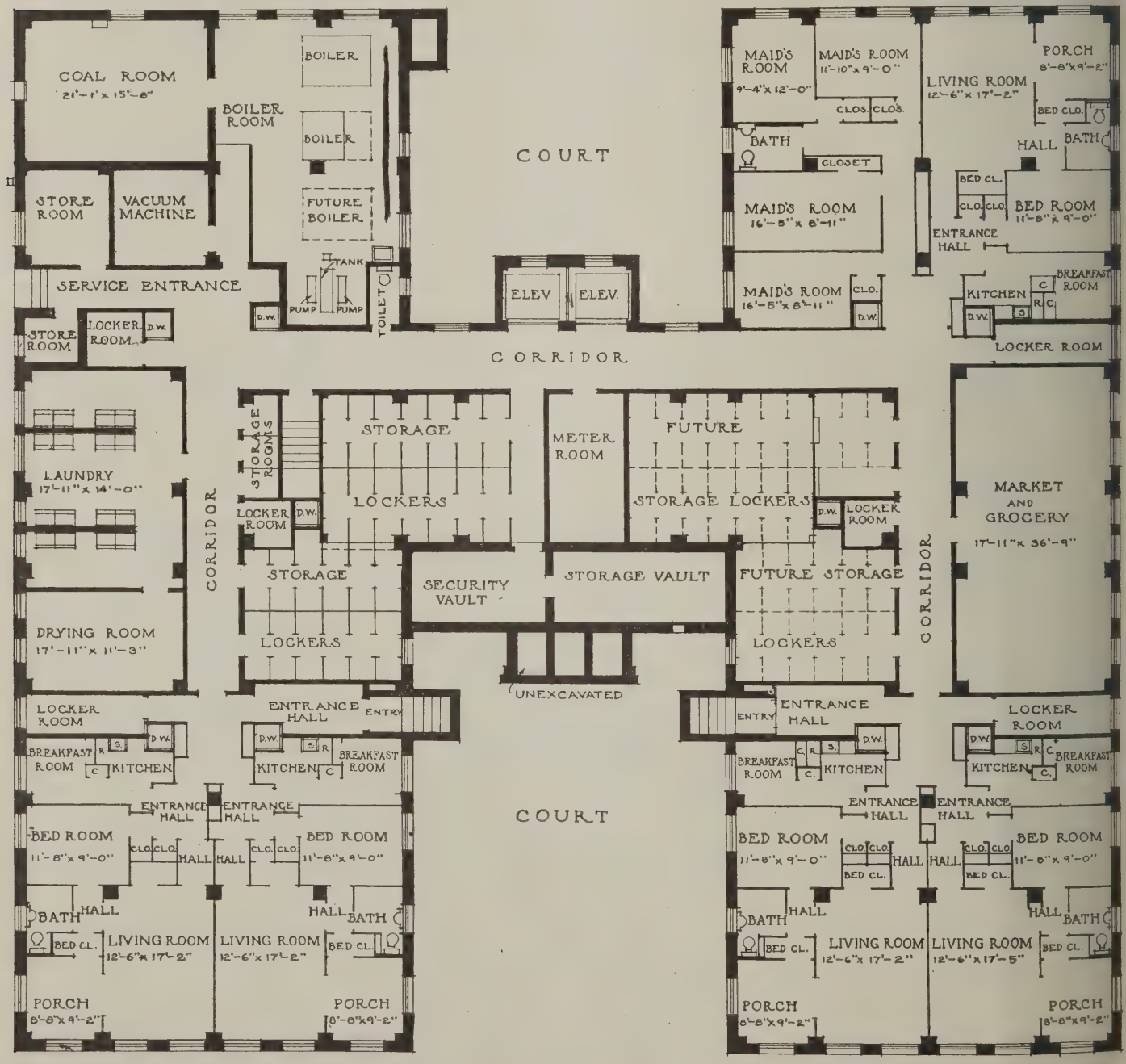
Automatic interlocking door fixtures feature the enclosure doors at all landings. These prevent the movement of the car unless all doors are closed and locked, and also prevent the opening of any door excepting the one to which the car has been sent or called, and then only when the car has stopped at that landing.

Automatic non-interference protection is provided. When the car is in use, pressure on a button at any outside landing will not call the car until the car has reached its designated landing and the landing door has been opened and closed.

A storage vault for securities, also a storage vault for furs, occupy space in the center on the north side of the basement —the front of the bridge of the "H." The reinforced-concrete walls of both vaults are continuous. The one entrance is a steel door in the securities vault. The fur vault is reached through the back of the securities vault. On the "cold" side of the basement, furs store satisfactorily without refrigeration. The two vaults together are approximately 12 by 40 ft. This storage service is provided tenants without charge.

A laundry and drying room occupy space on the left-hand side of the basement, centrally. Mr. Waldman established a dish-washing service in space in the basement reserved on the plans for future storage lockers when the building should be added to. This service, unique in apartment houses, Mr. Waldman found entirely practical. The equipment required was an electric dishwasher (small restaurant size), shelving and baskets. The tenant simply throws her dishes together in a basket, despatches the basket to the basement via the dumb waiter, and the dishwashing department has the dishes for a family up to ten back to her in 15 minutes. The actual washing of the dishes takes only about five minutes. Mr. Waldman introduced this service without any direct charge against the tenants. He found actual operating cost about $2 a month per family.

The dishwasher is a Model AA "Crescent," manufactured at New Rochelle, N. Y., by the Crescent Washing Machine Co. It has a capacity of 3000 dishes an hour, operates with a ½-hp. motor, and has a length of 2 ft. 7½ in., a width of 2 ft. 2¼



BASEMENT PLAN.

in., and a height of 5 ft. 11 in.

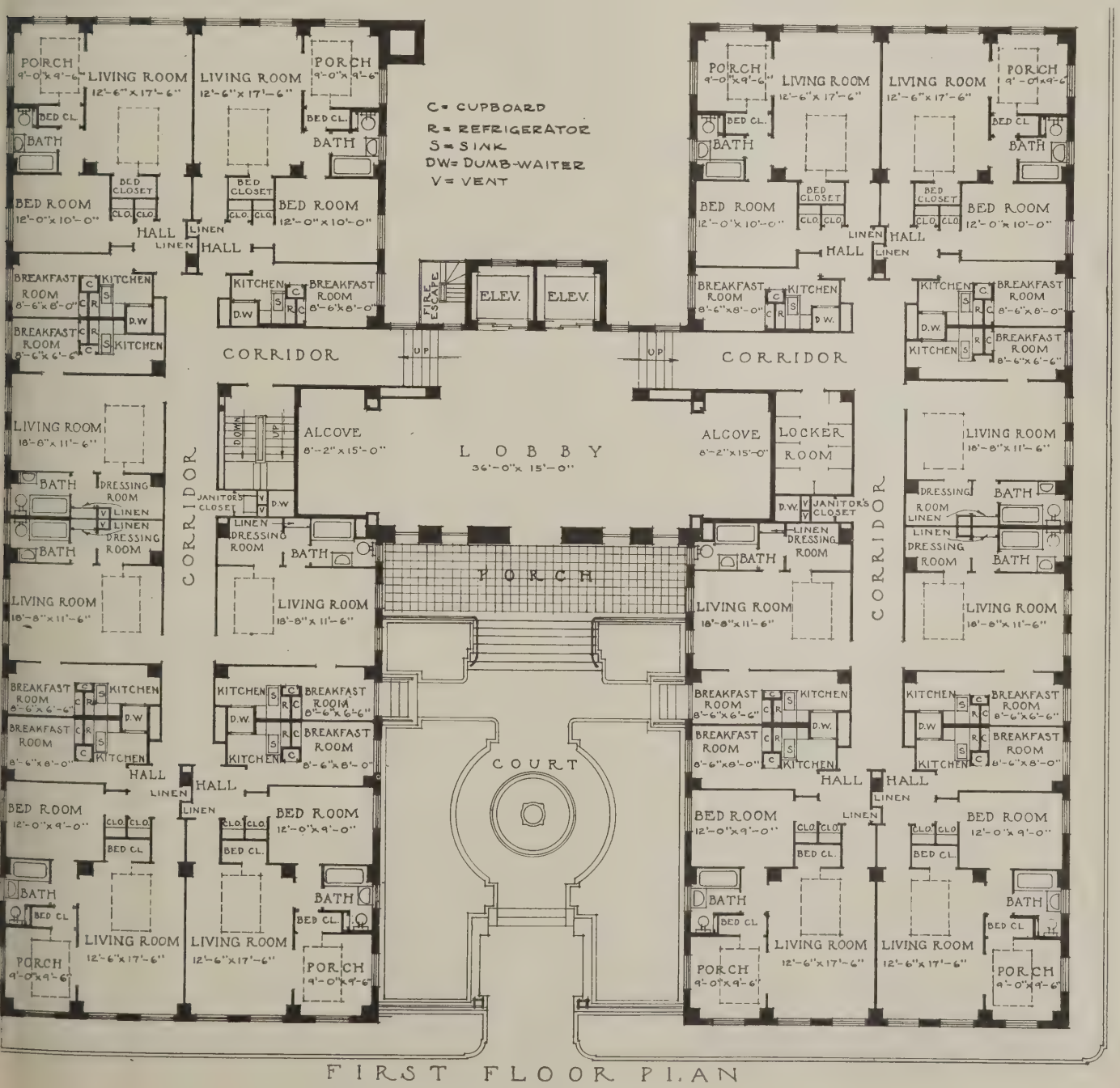
Using the dishwasher, the employe first scrapes the dishes in the usual manner. Then he places them in durable, wooden racks which prevent chipping and breakage. The racks are then slid into the machine. The employe pushes a button, and whirling torrents of clean, hot soapy water sent under pressure from revolving nozzles above and below the dishes wash the contents of the racks, in 30 seconds. The second operation, rinsing, requires only about 10 seconds. A valve handle is turned at the top of the machine, and clean, hot water rinses and sterilizes the dishes.

The laundry is equipped with an electric, laundry-size 1900 "Cataract" washer. Specifically, the laundry-size has 12-sheet capacity, compared with 8-sheet capacity of the domestic size. This washer uses the so-called double-oscillation, or "figure 8" principle, giving the greatest water agitation of any machine on the market. The tub is smooth, solid copper, tin planished. The tub has a large opening, making the removal of clothes convenient. The opening stops always in the same place. No stopping is involved in lifting linens from the tub.

Power is applied to each side of tub, through steel driving arms, removing all strain on tub. A banded steel frame, and adjustable jacks, so that machine can be lifted off castors, and also can be leveled up on inclining basement floor, are other features. This washer is manufactured at Binghamton, N. Y., by the "1900" Washer Co.

The clothes dryer in the laundry is a Hill-Canton, "results equal to drying clothes by sun and wind." A system of efficient ventilation is an outstanding characteristic of the Hill-Canton. The system of heating and ventilating is such that clothes at all times are surrounded by ever changing, heated fresh air. Clothes cannot discolor, nor can they have a laundry odor. The Hill-Canton can be installed, as conditions indicate to use steam, laundry stove, or natural or artificial gas.

The gas burners are placed inside the special air-tight radiators, through which the gas fumes and other products of combustion are carried to chimney opening.



FIRST FLOOR PLAN

The cabinet is ventilated through burner box.

The building is heated by the Webster system, using Utica boilers and Nash electric vacuum pump. This is a two-pipe system. The mains are in rough space, supplying the radiators through a graduated inlet valve at the top. Each radiator has an individual trap connected to a system of returns into a combination vacuum and boiler feed pump discharging directly into the boilers. The system is designed to operation for less than 1 lb. of pressure.

Other service facilities for tenants feature the basement. Storage lockers for all tenants are provided. Here, centrally located on the right-hand side of the basement, is a market and grocery. This occupies space approximately 18 by 37 ft. A floor drain, a gas outlet for range and vent for range, together with hot and cold water and waste connection, are installations for the market and grocery.

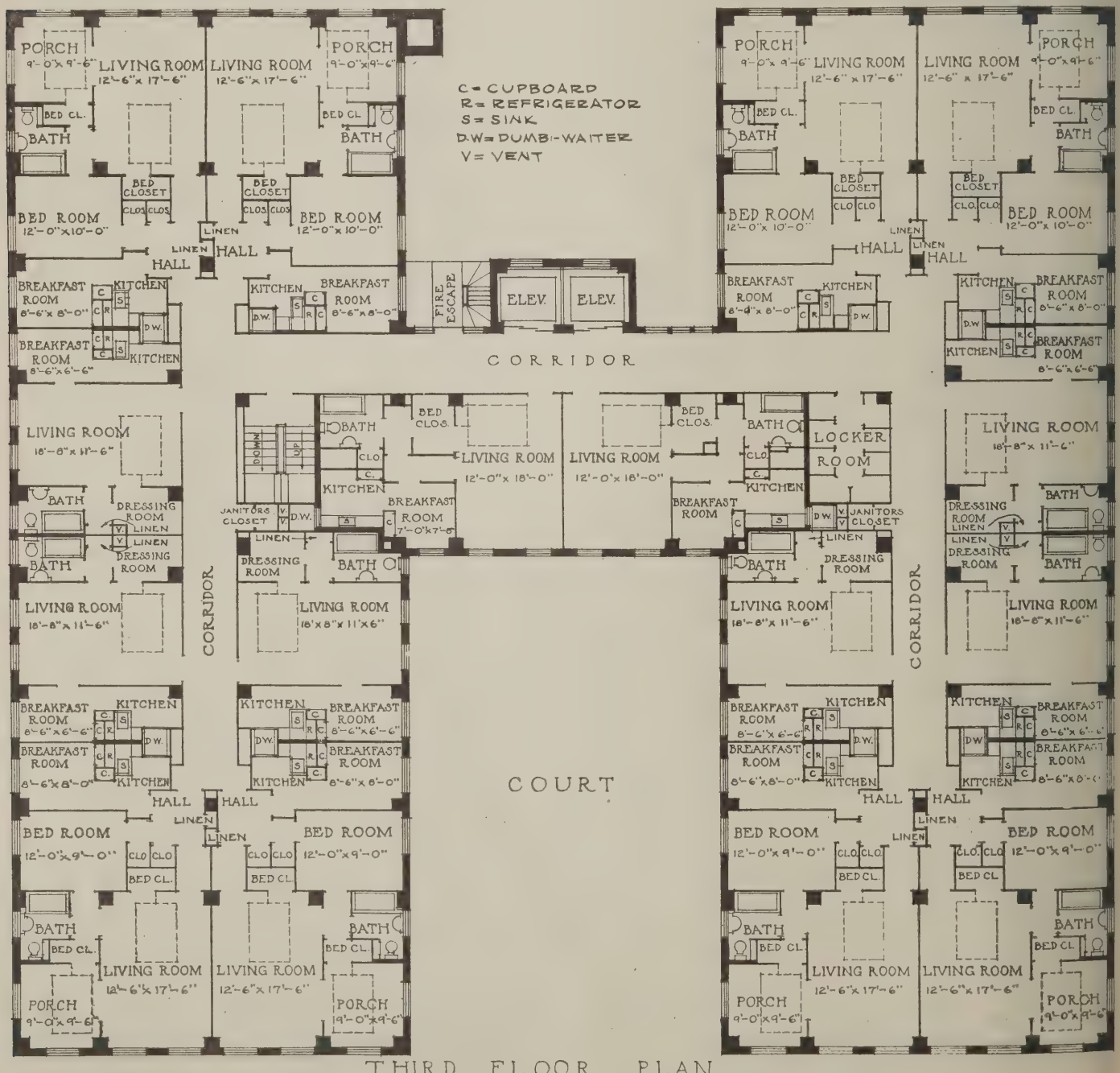
A service entrance in the basement, together with a storage room close by, are used by the receiving department. This department handles all deliveries for tenants, sending articles up via the dumb waiter.

The basement also contains five apartments as well as several maids' rooms.

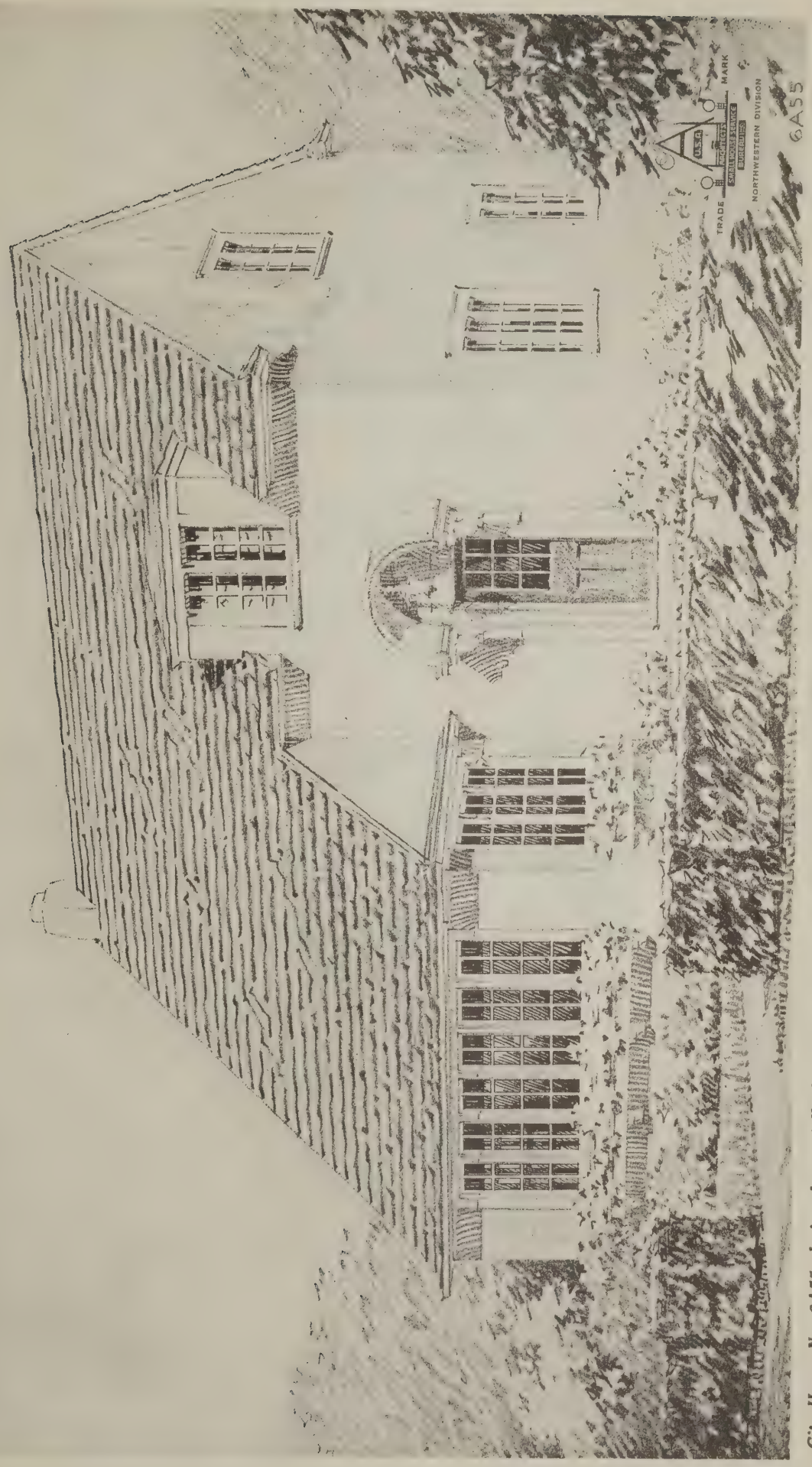
The baths have 1-in. white hexagon floors, and a 6 by 3 in. white glazed wall tile, with four or five set-in fixtures in each room. The tub, which was built in, was of the roll rim type, a "Pembroke." A Nedecken mixer shower with anti-scalding device, was standardized installation throughout. A shower curtain extended the full length of tub.

A pneumatic tank with electric pump system was put in at the Waldman so that water pressure could be maintained at whatever point wanted. In conjunction with this, Sloan flushing valves were used. Lavatories were vitrous china.

The house was equipped with Murphy closet beds throughout, 52 in all. The occupant of an apartment, by simply opening a closet door, revolves and lowers into the room a complete bed, mattress and other bed clothing undisturbed. The bed clothing is held in place by friction clamps at the foot, so that mattress and linen hang loosely from the top when the bed is upright in closet.



THIRD FLOOR PLAN



City House No. 6A55, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.
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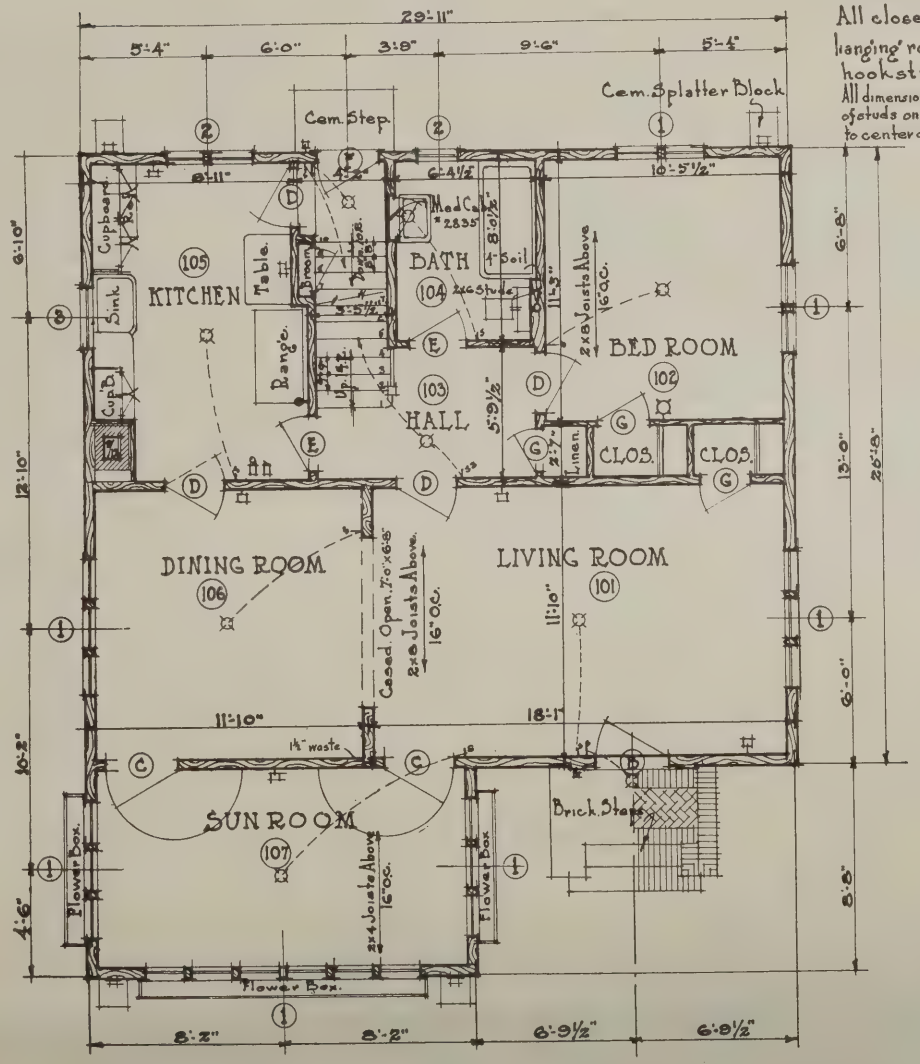
SCHEDULE OF WINDOWS

Quantity	Type	Description	No of Lights	Size Glass	Size of Open. for Sash	Thickness Sash	Frame.
22	1	Casement.	8	8X12	1'-8" x 4'-5"	1¾"	See Detail.
13	2	Casement	8	8X10	1'-8" x 3'-8"	"	"
1	3	Double Hung	6	10X16	2'-10½" x 3'-2"	1⅜"	"
5	5	Basement	3	8X10	1'-3" x 2'-4"	1⅜"	"

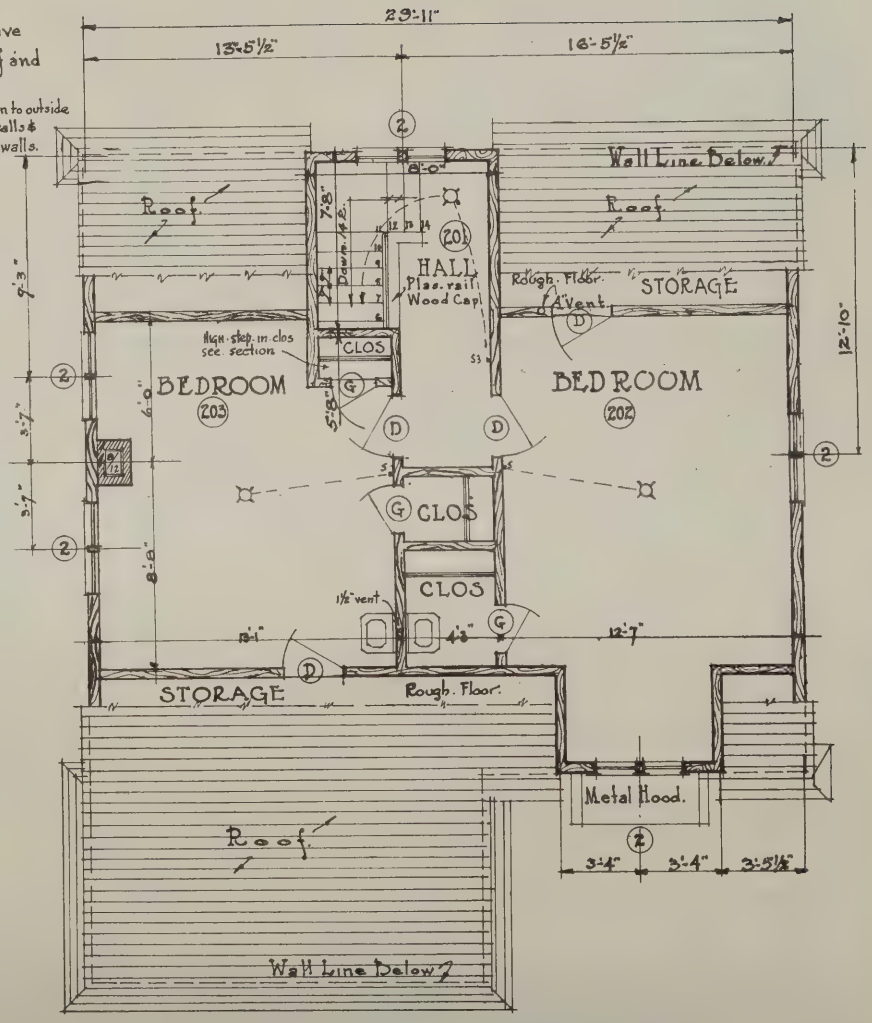
SCHEDULE OF DOORS

Quantity	type	size	Description	Remarks.
1	A	2'-6"x6'-8"x 1⅜"	UNIV. #720	5 Panel.
1	B	3'-0"x7'-0"x 1¾"	See Elev.	Front.
2	C	3'-0"x6'-8"x 1¾"	UNIV. #1605	Interior.
8	D	2'-6"x6'-8"x 1⅜"	" #1102	"
2	E	2'-4"x6'-8"x 1⅜"	" "	"
1	F	2'-8"x6'-8"x 1¾	" #753	Rear
5	G	2'-0"x6'-8"x 1⅜"	" #1102	Interior

Note
All closets to have hanging rod shelf and hookstrip.
All dimensions are taken to outside of studs on exterior walls & to center of interior walls.



FIRST FLOOR PLAN



SECOND FLOOR PLAN
Scale ¼"-1'-0"

0 1 2 3 4 5 6 7 8 9 10 FEET

Plans and Specifications of the Small Home Division of The Architects' Small House Service Bureau of the

Six-Room English Cottage No. 6A55

Charming Little City House with English Atmosphere and American Convenience

THIS is a six-room house which is designed particularly for future enlargement. The second story can be left entirely unfinished for the time being if one's family is small, for a bedroom and bath have been provided on the first floor. A similar design shown in the January issue of NATIONAL BUILDER was 4A26. The first story plans of these two designs are almost exactly alike.

Design 6A55, however, calls for a sunroom at the front completely enclosed and equipped with casement windows. Flower boxes line the windows and give a delightful note of color to the exterior. The entrance doorway has been placed where it balances nicely with the sun parlor. The exterior walls are of frame construction with stucco.

This house is designed to go on a lot less than 40 ft. in width, and as the rooms are now arranged, the house would do equally well for south, west, or north facings. It should be reversed for an eastern exposure. Of course, the living room and sunroom should be faced in the direction in which the view and light are the best.

A feature of this plan is that the dining and living rooms are thrown together to get a very large space only broken by the cased opening. These two rooms with the sunroom should make the living quarters of the house very commodious and delightful.

A brick flue has been provided for the kitchen in case anyone should use a coal-burning range. This may be omitted if coal is not used in the kitchen.

If for the time being the bedrooms in the second story are not finished, additional accommodation downstairs may be provided by arranging a closet bed in one of the closet spaces between the bedroom and the living room.

The house is a beautiful English type which should be a source of pride to anyone who should be fortunate enough to build it.

The regular price for this plan is $30.50. ($15.50 to NATIONAL BUILDER subscribers.)

EXCAVATING—194 cu. yd.

BACKFILL—40 cu. yd.

FOUNDATION—If 12" concrete, 42 cu. yd. gravel, 170 sax cement; if 9" concrete, 34 cu. yd. gravel, 138 sax cement; if 12" tile, 19500 CBM tile, 15 cu. yd. mortar; if 9" tile, 16000 CBM tile, 12 cu. yd. mortar, 1152 face brick, 55 lb. mortar color.

CEMENT FLOOR—5 cu. yd. gravel; 4 cu. yd. sand; 56 sax cement; 4 cement spatter blocks.

CHIMNEY—1200 common brick; 34 lin. ft. 8x12 flue tile; 1—8x8 cleanout door; 1 cu. yd. mortar; 5 yd. metal lath.

LATH—9 sq. yd. metal over boiler; 8400 wood; 235 sq. yd. metal for exterior.

PLASTER—9 sq. yd. plaster on metal lath; 610 sq. yd. plaster on wood lath; 13 sq. yd. Keene's cement.

STUCCO—235 sq. yd. stucco on metal lath.

TILE FLOORS—42 sq. ft. ceramic tile; 23 lin. ft. cove base.

BRICK STEPS—250 paving brick.

LUMBER—2—6x6-7 posts; 3—6x10-10 girders; 6—2x4-10 girder ribbon; 2—2x4-16 girder plates; 4 ft. plank cleanout cover; 3—2x4-14 stair horses; 2—2x4-16 platform framing; 3—2x4-16 basement partition plates; 12—2x4-7 basement partition studs; 160 ft. D & M basement partition sheathing; 13—2x10-9 first floor joist; 24—2x10-12 first floor joist; 24—2x10-14 first floor joist; 5—2x10-12 box sill; 1000 ft. com. bds. first floor subfloor; 1282 ft. 13/16x1½ first floor finish floor; 260 lin. ft. 1x3 bridging; 354 lin. ft. 2x4 first floor partition plates; 104—2x4-9 first floor partition studs; 1000 lin. ft. grounds; 4—2x4-16 stair stringers; 2—2x6-14 stair platform; 5—1x6-12 ribbon; 13—2x4-9 sun room ceiling joist; 24—2x8-12 second floor joist; 24—2x8-14 second floor joist; 2—2x10-14 doubles under partitions; 1—2x10-12 doubles under partitions; 2—2x8-12 doubles under partitions; 1—2x8-14 doubles under partitions; 3—2x10-16 headers; 3—2x8-14 headers; 800 ft. com. bds. second floor subfloor; 562 ft. 13/16x1¼ second floor finish floor; 240 lin. ft. 2x4 second floor partition plates; 70—2x4-8 second floor partition studs and dormer studs; 30 lin. ft. 1x6 ridge rafter; 378 lin. ft. 2x4 outside wall plates; 80—2x4-14 outside wall studs; 30—2x4-9 outside wall studs; 20—2x4-10 gable studs; 24—2x4-16 second floor ceiling joist; 2000 ft. shiplap wall sheathing; 48—2x4-18 rafters; 14—2x4-12 rafters; 4—2x4-16 dormer rafters; 20—2x4-16 lookouts; 1500 ft. com. bds. roof sheathing; 11¼ M shingles; 20—2x4-14 scaffold and extras; 8—2x6-16 scaffold and extras; 5—2x8-16 scaffold and extras; 3—2x10-14 scaffold and extras; 2—2x12-16 scaffold and extras.

MILLWORK—**Frames**: 5 cellar sash frames 8x10-3L-1⅜; 2 mul. casement frames 8x12-8L-1¼; 4 triple casement frames 8x12-8L-1¼; 1 sextuple casement frames 8x12-8L-1¼; 1 single casement frame 8x10-8L-1¼; 4 mul. casement frames 8x10-8L-1¼; 1 check rail wd. frame 10x16-6L-1⅜; 2 quarter circle sash frames 1⅜. **Windows**: 22 casements 8x12-8L-1¼; 9 casements 8x10-8L-1¼; 1 window 10x16-6L-1⅜; 2 quarter circle sash 1⅜; 5 cellar sash 8x10-3L-1⅜. **Storm Sash**: 22 8x12-8L-1⅛; 9—8x10-8L-1⅛; 1—10x16-6L-1⅛; 2 quarter circle 1⅛; 5—8x10-3L-1⅛. **Screens**: 22—8x12-8L-1⅛; 9—8x10-8L-1⅛; 1—10x16-6L-1⅛; 2 quarter circle 1⅛; 5—8x10-3L-1⅛. **Outside Door Frames**: 1—3'0x7'0-1¾; 1—2'8x6'8-1¾. **Outside Doors**: 1—3'0x7'0-1¾ Elev.; 1—2'8x6'8-1¾ (No. 753). **Storm Doors**: 1—3'0x7'0-1⅛; 1—2'8x6'8-1⅛. **Screen Doors**: 1—3'0x7'0-1⅛; 1—2'8x6'8-1⅛. **Outside Millwork**: 190 lin. ft. cornice; 2—6'0 flower boxes; 1—12'0 flower boxes; 10 flower-box brackets; 2 entrance brackets; 1 special entrance trim. **Interior Doors**: 1—2'6x6'8-1⅜ (No. 720); 2—3'0x6'8-1¾ (1605); 5—2'6x6'8-1⅜ (1102); 2—2'4x6'8-1⅜ (1102); 3—2'0x6'8-1⅜ (1102). **Jambs**: 1—2'6x6'8; 2—3'0x6'8; 5—2'6x6'8; 2—2'4x6'8; 3—2'0x6'8; 1—7'0x6'8. **Interior Trim**: 5 sides 8x10-3L; 2 sides mul. 8x12-8L; 4 sides triple 8x12-8L; 1 side sextuple 8x12-8L; 1 side single 8x10-8L; 4 sides mul. 8x10-8L; 1 side wd. 10x16-6L; 2 sides quarter circle; 1 side door 3'0x7'0; 1 side door 2'8x6'8; 2 side door 2'6x6'8; 4 side door 3'0x6'8; 10 side door 2'6x6'8; 4 side door 2'4x6'8; 6 side door 2'0x6'8; 2 side opening 7'0x6'8; 1 flight basement stairs with rail; 1 flight main stairs with rail; 1 medicine cabinet No. 2835; 1 broom cabinet; 1 linen cabinet; 1—4'6 kitchen cabinet; 1—2'0 kitchen cabinet; 1 drop leaf table; 450 lin. ft. base; 450 lin. ft. base shoe; 450 lin. ft. base molding; 200 lin. ft. picture molding; 128 lin. ft. ceiling cove; 16 lin. ft. closet shelving; 8 lin. ft. closet hook strip; 8 lin. ft. closet clothes rod; 6 lin. ft. threshold; 1 flight grade stairs to kitchen; 1—24x24 screened vent. **Note**: If dining room, living room and sunroom trim is changed, it will affect the following items: 1 door 3'0x7'0-1¾; 1 side trim 3'0x7'0; 2 doors 3'0x6'8-1¾ (1605); 2 jambs 3'0x6'8; 4 side trim 3'0x6'8; 2 doors 2'6x6'8-1⅜ (1102); 1 jamb 2'6x6'8; 2 side trim 2'6x6'8; 1 door 2'0x6'8-1⅜ (1102); 1 side trim 2'0x6'8; 1 jamb 7'0x6'8; 2 side trim 7'0x6'8; 4 sides triple trim 8x12-8L; 1 side sextuple trim 8x12-8L; 110 lin. ft. base; 110 lin. ft. base shoe; 110 lin. ft. base molding; 128 lin. ft. ceiling cove; 128 lin. ft. picture molding; 672 ft. 13/16x1½ flooring.

TINWORK—90 lin. ft. gutter; 30 gutter hangers; 6 miters; 14 gutter ends; 4 nipples; 4 strainers; 4 elbows; 4 offsets; 50 lin. ft. conductor; 8 conductor hooks; 4 shutoffs; 5 lin. ft. chimney flashing; 70 sq. ft. tin deck; 200 tin shingles; 1 roof for entrance standing seam circle; 2—6'0 flower box linings; 1—12'0 flower box lining; 20 lin. ft. valley tin; 30 lin. ft. flashing tin.

INSULATION—3 rolls for floors; 4 rolls for walls; 3 rolls for roof; 1700 ft. ½" insulation walls; 850 ft. ½" insulation ceilings.

HARDWARE—5 cellar sash sets; 31 casement sash sets; 1 sash lock; 1 sash lift; 39 storm sash sets; 39 screen sets; 1 front door set with butts; 1 rear door set with butts; 2 storm door sets with butts; 2 screen door sets with butts; 1 floor hinge; 2 push plates; 17 inside lock sets with butts; 3 doz. clothes hooks; 4 stair rail brackets; 20 door bumpers; 900 lb. assorted nails; 4 lb. assorted brads; 30 lb. sash weights; 24 ft. sash cord; 1 coal chute; (medicine cabinet: 1 pr. ornamental butts, 1 cupboard turn); (broom closet: 1 pr. ornamental butts, 1 cupboard turn); (kitchen cabinet: 11 pr. ornamental butts, 8 cupboard turns, 3 elbow catches, 1 set bin castors, 1 bin pull, 4 drawer pulls); 4 linen closet drawer pulls; 1 pr. drop leaf hinges.

WEATHER STRIPPING—22 casements 8x12-8L; 9 casements 8x10-8L; 1 window 10x16-6L; 5 sash 8x10-3L; 1 door 3'0x7'0; 1 door 2'8x6'8.

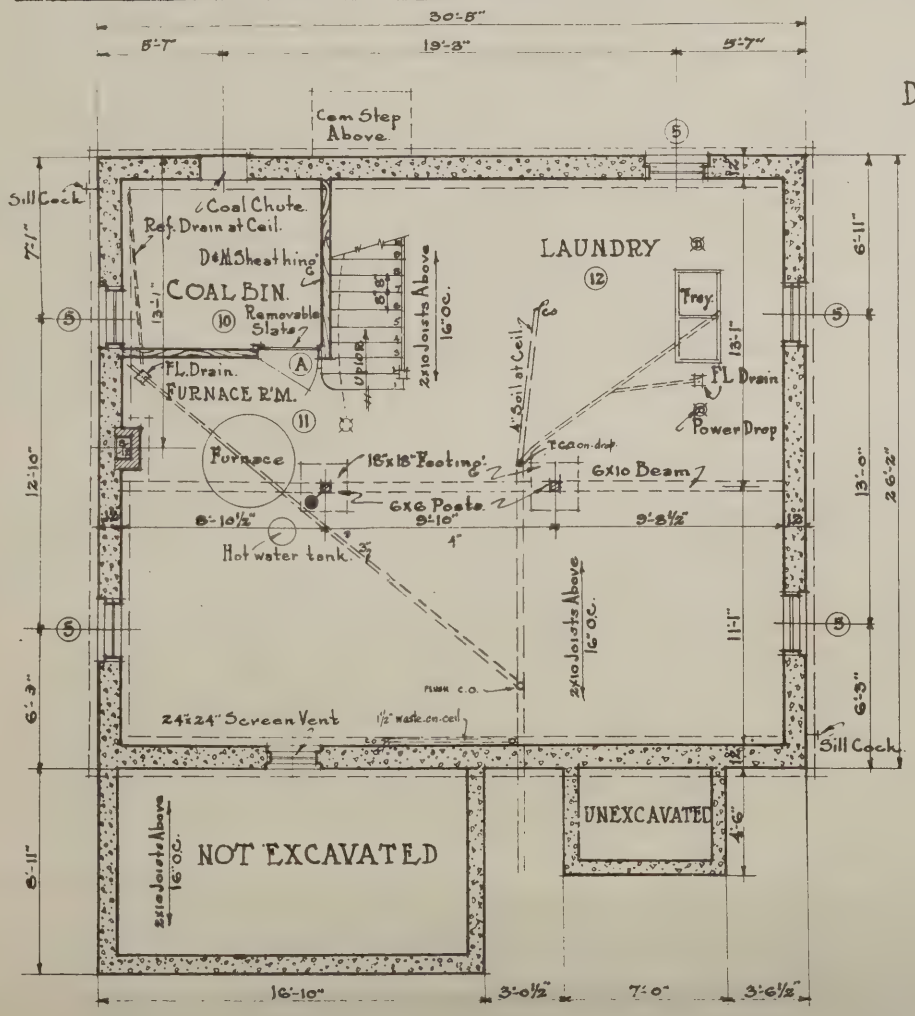
CAULKING—9 single frames; 6 mullion frames; 4 triple frames; 1 sextuple frames; 1 coal chute.

EXTERIOR PAINTING—5 gal. trim paint; 1 gal. boiled oil; 35 gal. shingle stain; 1 gal. screen paint; 1 gal. sash paint; ½ gal. shellac; 1 gal. japan; 10 lb. putty; ½ gal. metallic paint.

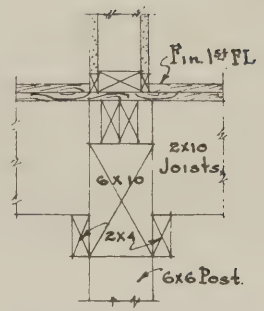
INTERIOR PAINTING—12 gal. white paint; 7 gal. enamel; 4 gal. filler stain; 3 gal. shellac; 5 gal. floor varnish; 10 gal. interior varnish; 3 gal. floor shellac; 1 gal. oil; 2 gal. japan; 1 gal. turpentine; 1 gal. alcohol; 3 lb. steel wool; 2 doz. sheets sandpaper.

The chart below shows the symbols used on all the plans of The Architects' Small House Service Bureau of the United States, Inc.

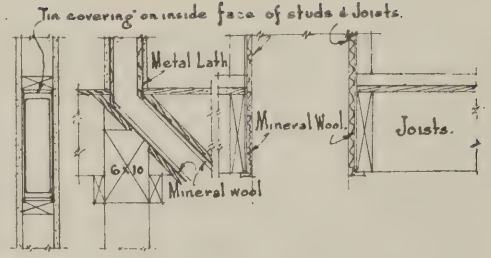
MATERIALS		ELECTRIC WIRING SYMBOLS			
CONCRETE		CEILING OUTLET		3 WAY SWITCH	
BRICK		DROP CORD		GAS OUTLET	
WOOD		BRACKET		PUSH BUTTON	
PLASTER		BASE PLUG		BELL OUTLET	
		SWITCH		BUZZER	



BASEMENT PLAN
Scale ¼"-1'-0"

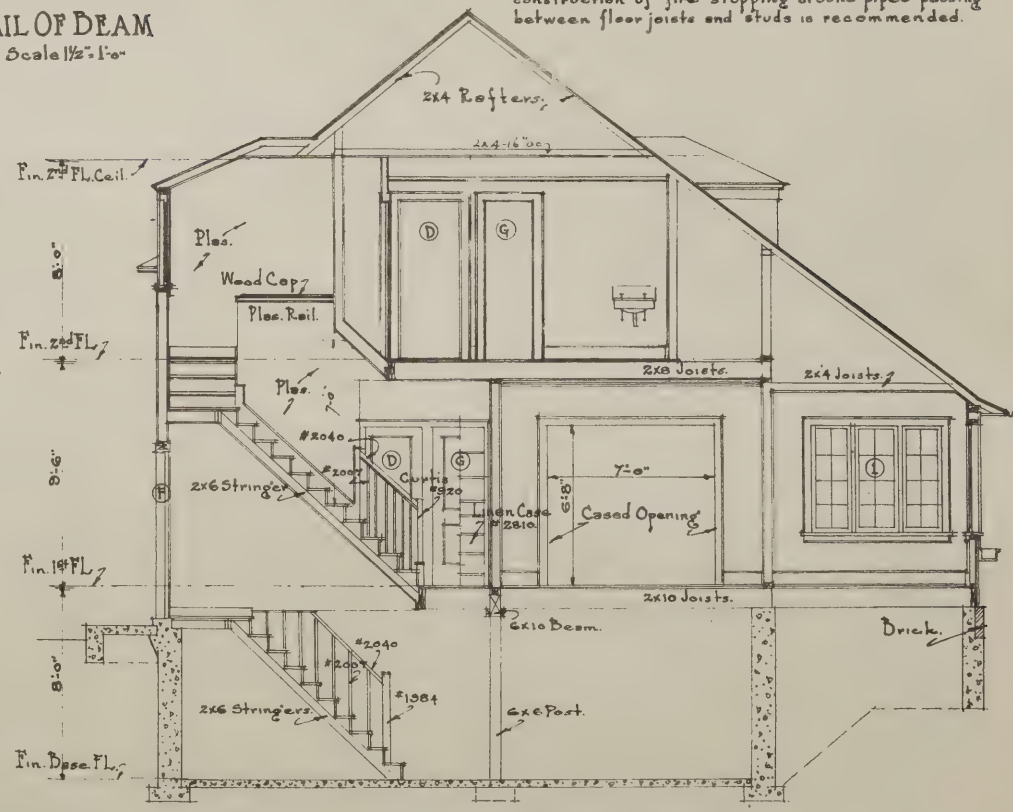


DETAIL OF BEAM
Scale 1½"-1'-0"



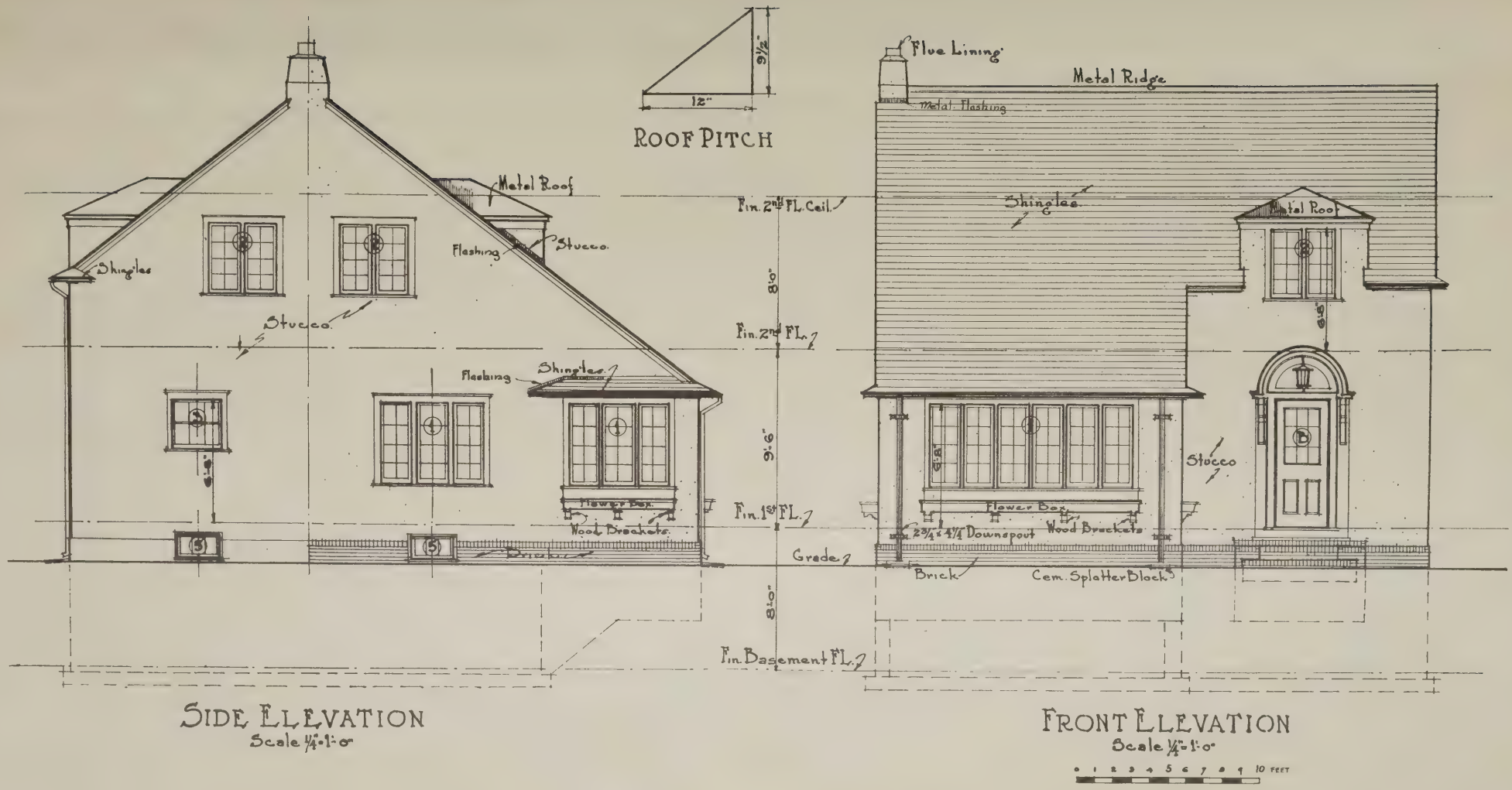
PLAN SECTIONS

In case hot air furnace and piping are used this construction of fire stopping around pipes passing between floor joists and studs is recommended.

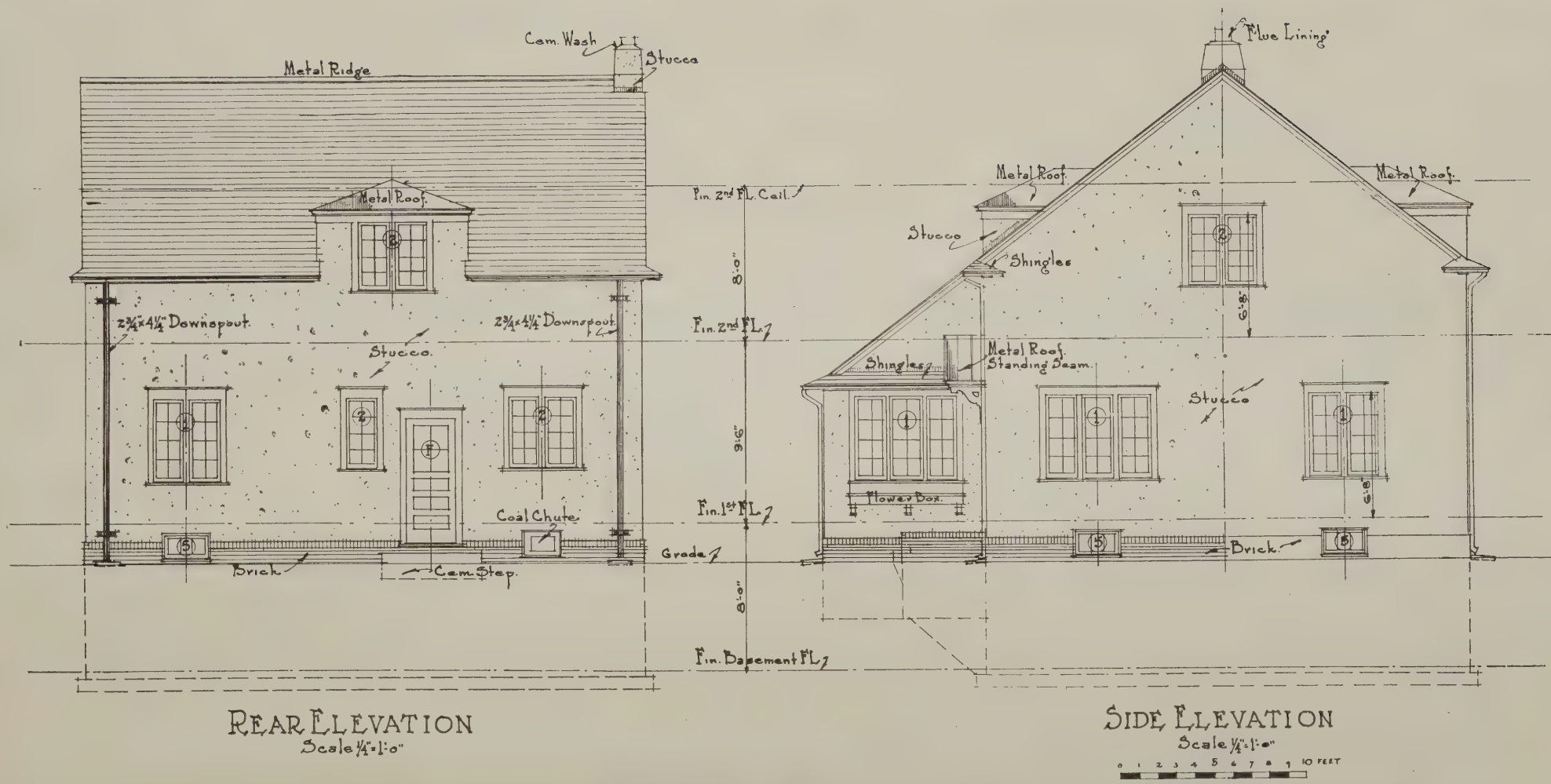


SECTION
Scale ¼"-1'-0"

0 1 2 3 4 5 6 7 8 9 10 FEET



Front and side elevations of House No. 6A55, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc. Copyrighted by National Builder and The Architects' Small House Service Bureau

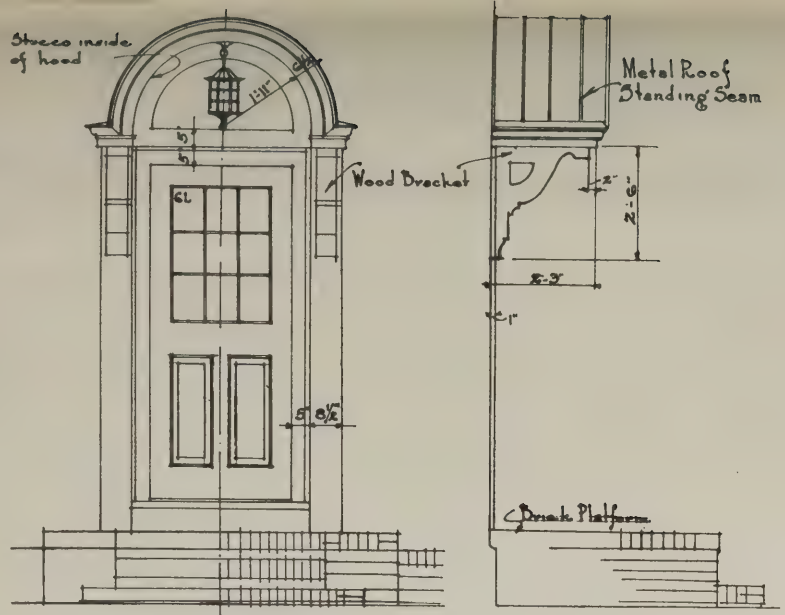


REAR ELEVATION
Scale ¼"-1'-0"

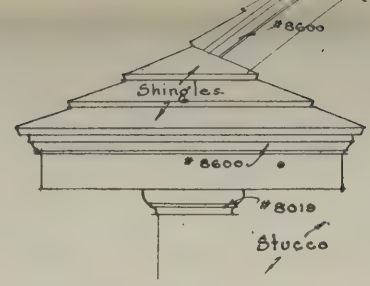
SIDE ELEVATION
Scale ¼"-1'-0"

0 1 2 3 4 5 6 7 8 9 10 FEET

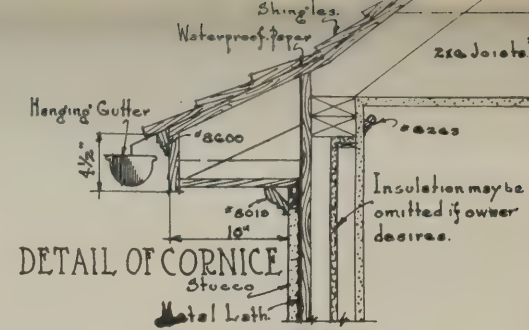
Rear and side elevations of House No. 6A55, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc. Copyrighted by National Build er and The Architects' Small House Service Bureau



DETAIL MAIN ENTRANCE
Scale 1/2"=1'-0"



ELEVATION OF CORNICE
Scale 1½"=1'-0"

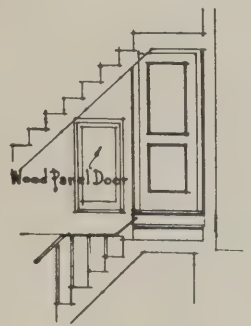


DETAIL OF CORNICE

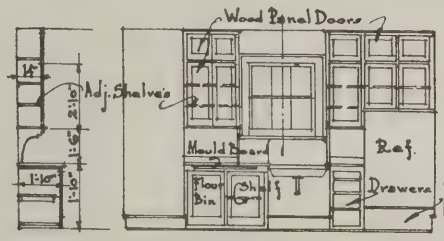
HEAD

JAMB

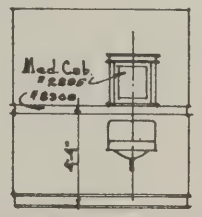
SILL



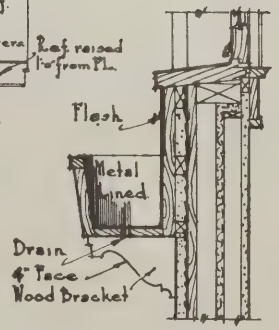
CASE OVER BASEMENT STAIR
Scale ¼"=1'-0"



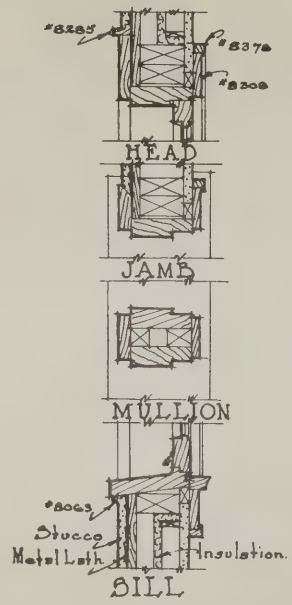
Scale ¼"=1'-0"



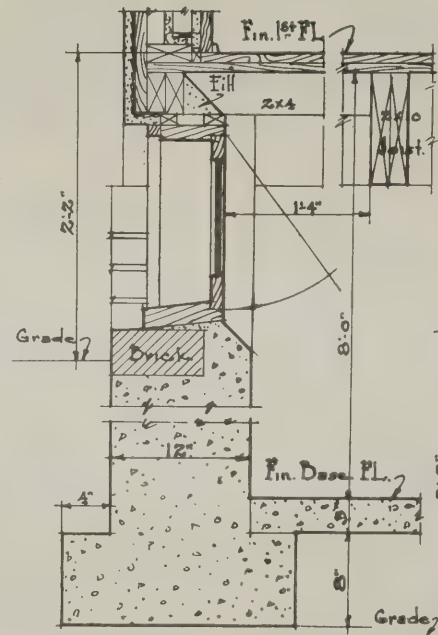
ELEVATION OF BATH R'M.
Scale ¼"=1'-0"



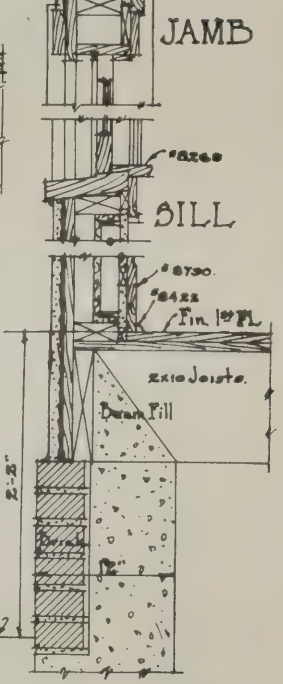
DETAIL OF FLOWER BOX
Scale 1½"=1'-0"



TYPICAL CASEMENT WINDOW
Scale 1½"=1'-0"



DETAIL OF BASE WIND. AND FOOTING
Scale 1½"=1'-0"



TYPICAL DOUBLE HUNG WINDOW
Scale 1½"=1'-0"

Details of House No. 6A55, designed by the Northwestern division of the Architects' Small House Service Bureau of the United States, Inc. Copyrighted

Ideas, Ideals, and Ambition

How These Three Factors Brought Success to Two Young Builders of Louisville, Ky.

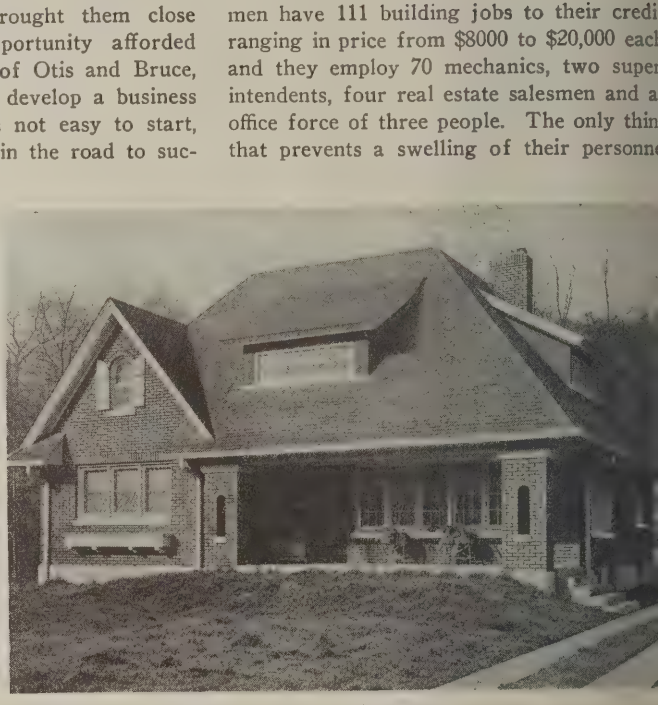
MANY a young man employed in the building business has often dreamed of heading a concern of his own, but few have been so fortunate as to see such a dream realized in little more than two years' time. Such, however, has been the experience of W. Earle Otis and Helm Bruce, Jr., who head the firm of Otis and Bruce, of Louisville, Ky.

Prior to February, 1921, both Otis and Bruce were employed by the same Louisville realty firm, Otis as an architect and Bruce in the real estate sales department. Working in the same office, their common ambitions and ideals brought them close together and when opportunity afforded they launched the firm of Otis and Bruce, with a determination to develop a business through service. It was not easy to start, and the usual obstacles in the road to success blocked their path as it has the paths of many who had gone before, but by means of adherence to a set plan and with a high standard of service which has been excellently maintained, the firm of Otis and Bruce has come to rank high among Louisville's successful builders.

Since February, 1921, these two young men have 111 building jobs to their credi ranging in price from $8000 to $20,000 eac and they employ 70 mechanics, two supe intendents, four real estate salesmen and a office force of three people. The only thin that prevents a swelling of their personn list is the fact that good building mechani are hard to find.

The thing that put Otis and Bruce "o their feet" was the "Electric Home," bui soon after their partnership was establishe and opened to the public on October 2 1921. This electric home was built with th co-operation of the Electric Club of Loui

Home of Helm Bruce, Jr.



Home of F. R. Champlin

These two houses were designed and built by Otis and Bruce and serve to illustrate the types of construction handled by this firm

Drug store and apartment for G. R. McGinnis

Interior of McGinnis drug store

All of the fixtures for this drug store, including the fountain, were built on the job by Otis and Bruce men. This store won the first prize for arrangement and cleanliness from the Kentucky Board of Pharmacy in 1922. Note that the prescription department is entirely open to the public

ville, an organization of electrical contractors and dealers. No expense was spared in erection, and all workmanship and materials were of the highest grade. The drawing feature of this home was the fact that it contained every electrical appliance that could possibly be installed. This home was widely advertised and in the two weeks it was open 26,000 people passed through its doors. When they left, each one of the 26,000 carried with them some advertising circulars from the firm of Otis and Bruce and it was not long after this event that business began to pour in.

The ideal that has made the firm of Otis and Bruce what it is today is service. A project is carried through from conception to completion. When a prospective client enters the office of Otis and Bruce he is given all the assistance he requires. If he has no definite idea of a location he is assisted to find a desirable site which is suitable to his taste as well as his pocket-book. When the ground has been selected sketches

Residence in Windsor Place. Designed by Otis and Bruce

Residence of Oscar Paul. Designed and built by Otis and Bruce

The "Electric Home." This house was designed and built by Otis and Bruce with the co-operation of the Electric Club of Louisville. It was an important factor in the firm's success

One of a group of four bungalows

Residence in Willow Place, designed by Otis and Bruce

Two views of the living room in the home of Helm Bruce, Jr., of the firm of Otis and Bruce. This house was designed and built, and the interior decorations carried out by the firm's own staff. Turn to the style sheet for a photograph of the house

are prepared and from the sketches, working drawings. Should the client not desire to give the erection contract to Otis and Bruce or if he changes his mind about building, the only charge is the regular architects' rate for the plans and specifications. When the plans are finished and approved and the project ready to begin, a contract is drawn up on a cost-plus-fixed-fee basis and the construction department is set to work. Aside from estimating costs, drawing plans, and assisting in the selection of a site this firm renders financial service, assists in interior decoration and aids the client to secure water, gas, and paving.

Mr. Otis' idea of service is expressed in the following words: "When a man comes to me with $15,000 to build a home he is really asking me to help him invest that sum, and I feel that I am in the same position as a banker who has this same man come to him with the same amount of money, asking for assistance in the selection of bonds for investment. Just as the banker would strive to recommend such securities as were safest and productive of the highest yield, so do we aim to help our client in the selection of a home which will provide him with a permanent investment and give him the greatest amount of satisfaction. That is the whole secret of our success."

The firm of Otis and Bruce was recently incorporated with W. Earle Otis as president and head of the architectural and building department, and Helm Bruce, Jr. as first vice-president and head of the financing and real estate sales department. To date, Otis and Bruce have been building only homes of the better class for a highly select clientele and due to this fact, and because all their construction projects are on a cost-plus-fixed-fee basis they have managed to steer clear of the two largest causes for wrecks in the building business—second mortgage paper and advancing material costs. It may be interesting to note that both are under 30 years of age.

Useless Metal Lath Varieties Eliminated

REDUCTION from more than 80 varieties to 10 of expanded flat metal lath and from more than 70 to 7 in ⅜-in. expanded rib lath now being used extensively in the building industry, was recommended recently at a conference of metal lath manufacturers, users and distributors held at the Department of Commerce under the auspices of the Division of Simplified Practice.

The results of a survey of the excess and useless weights of metal lath, made by the Metal Lath Manufacturers' Association, were used as a basis for eliminations, and retention. The adoption of the following recognized standards of weight in this commodity during the year July 1, 1923, to July 1, 1924, was recommended by the conference:

FLAT EXPANDED LATH

Painted Steel	Special Metal	Galvanized Before
2.2	2.2	------
2.5*	2.5*	2.5
3.0*	3.0*	------
3.4	3.4	3.4

⅜" RIB EXPANDED LATH

2.5	------	------
3.0*	3.0*	------
3.8*	3.8*	------
4.8	4.8	------

*The conference urged that every effort be made in the industry to direct practice to a consolidation of the two starred sizes to a single intermediate weight. This is to be made effective, if possible, at the next conference.

Tolerance to be not greater than plus or minus 0.1 lb. per sq. yd.

The conferees are of unanimous agreement that adoption of the recommended standard weights, which will amply supply the needs of construction, by the industry as a whole, will result in the greatest benefit to manufacturers, distributors and users of the article affected.

A second conference on sheet lath was held December 18, at the William Penn Hotel, Pittsburgh, Pa.

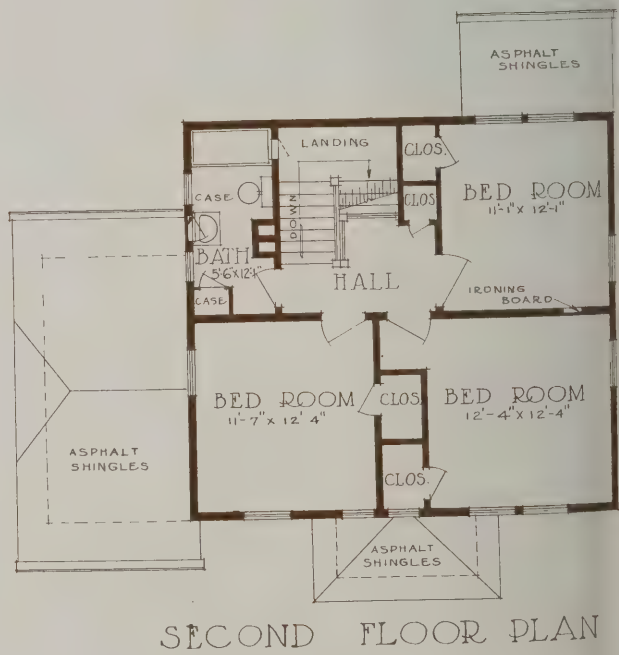
National Builder Style Sheet

Residence of Sidney Jenkins, Louisville, Ky. Designed and built by Otis and Bruce. This house is of light gray stucco with white-painted woodwork and red-tile roof

Floor plans of the Sidney Jenkins residence

Residence of Paul Pilcher, Louisville, Ky. Designed and built by Otis and Bruce. Note the old-world touch rendered by the leaded glass windows and quaint blinds

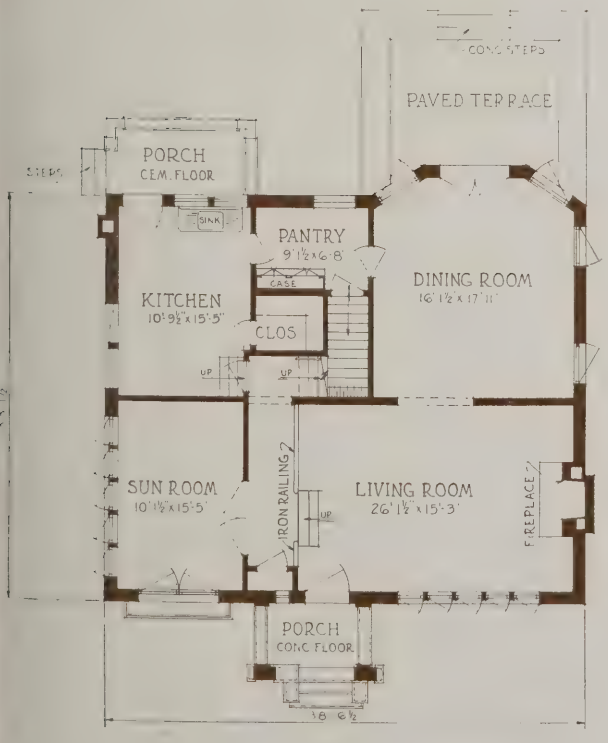
FIRST FLOOR PLAN



SECOND FLOOR PLAN

Floor plans of the Paul Pilcher residence

Residence of W. O. Robertson, Louisville, Ky. Designed and built by Otis and Bruce. The wrought-iron work adds much to the effectiveness of the design

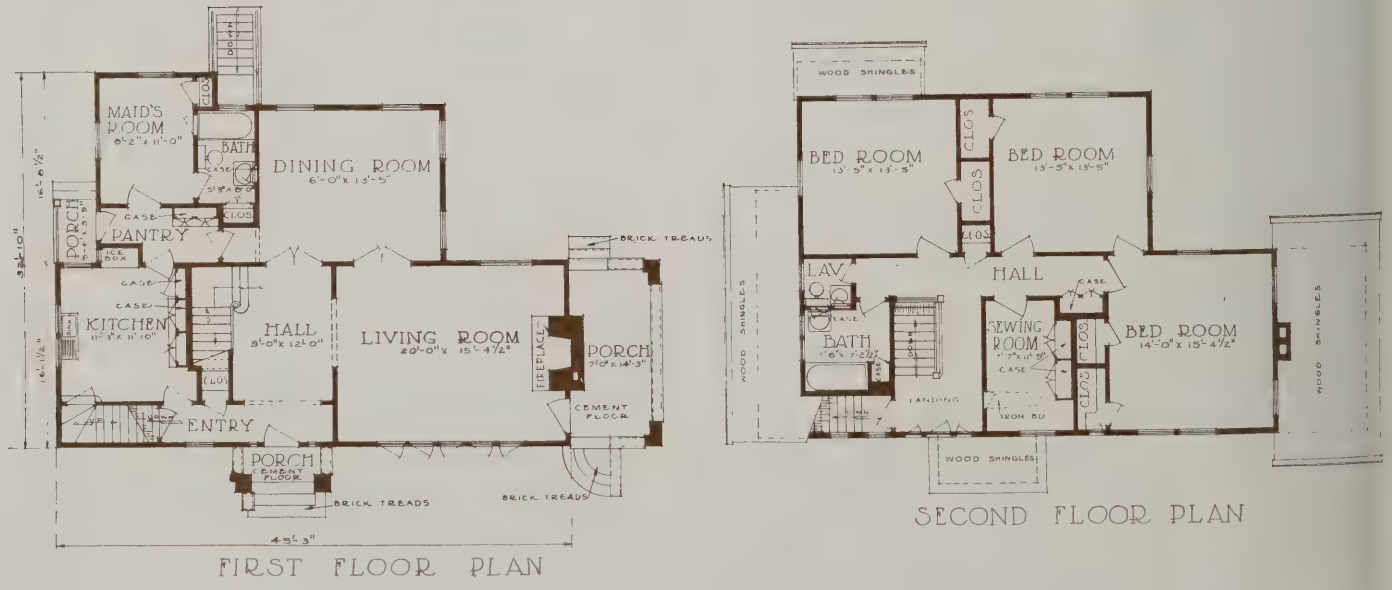


FIRST FLOOR PLAN

SECOND FLOOR PLAN

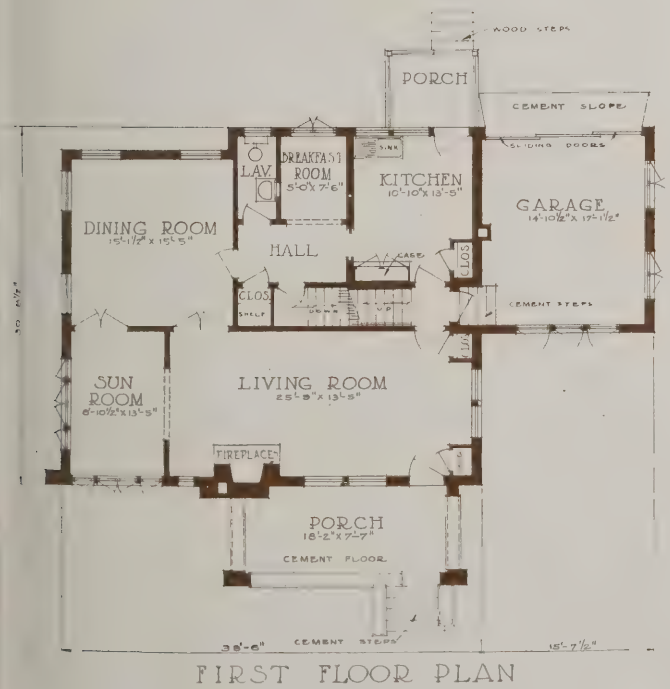
Floor plans of the W. O. Robertson residence

Residence of Alex Forrester, Louisville, Ky. Designed and built by Otis and Bruce. Note the timbered entrance and the vari-colored asbestos shingles



Floor plans of the Alex Forrester residence

Residence of W. G. Giles, Louisville, Ky. Designed but not built by Otis and Bruce. This house is of dark-colored brick, with a composition shingle roof



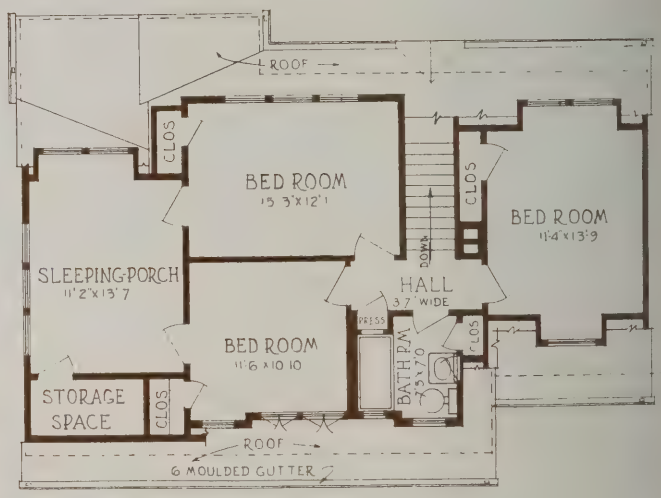
FIRST FLOOR PLAN

SECOND FLOOR PLAN

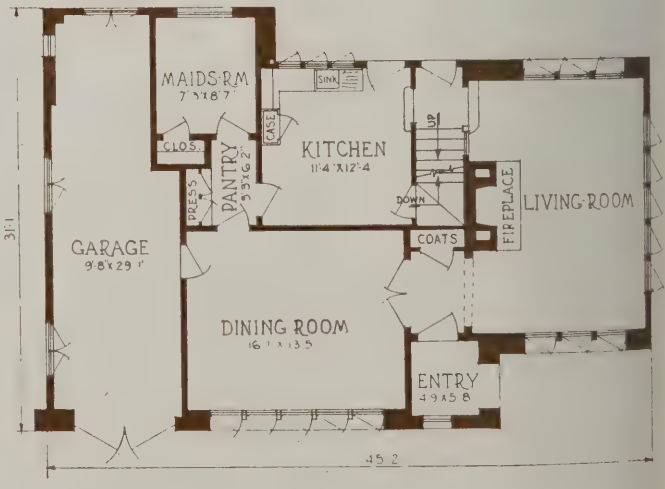
Floor plans of the W. G. Giles residence

Home of Helm Bruce, Jr., Louisville, Ky. Designed and built by Otis and Bruce

Entrance detail, home of Helm Bruce, Jr., Louisville, Ky. Note two pieces of random stone in stucco work above arch. All stone for this building was obtained by blasting out for the cellar

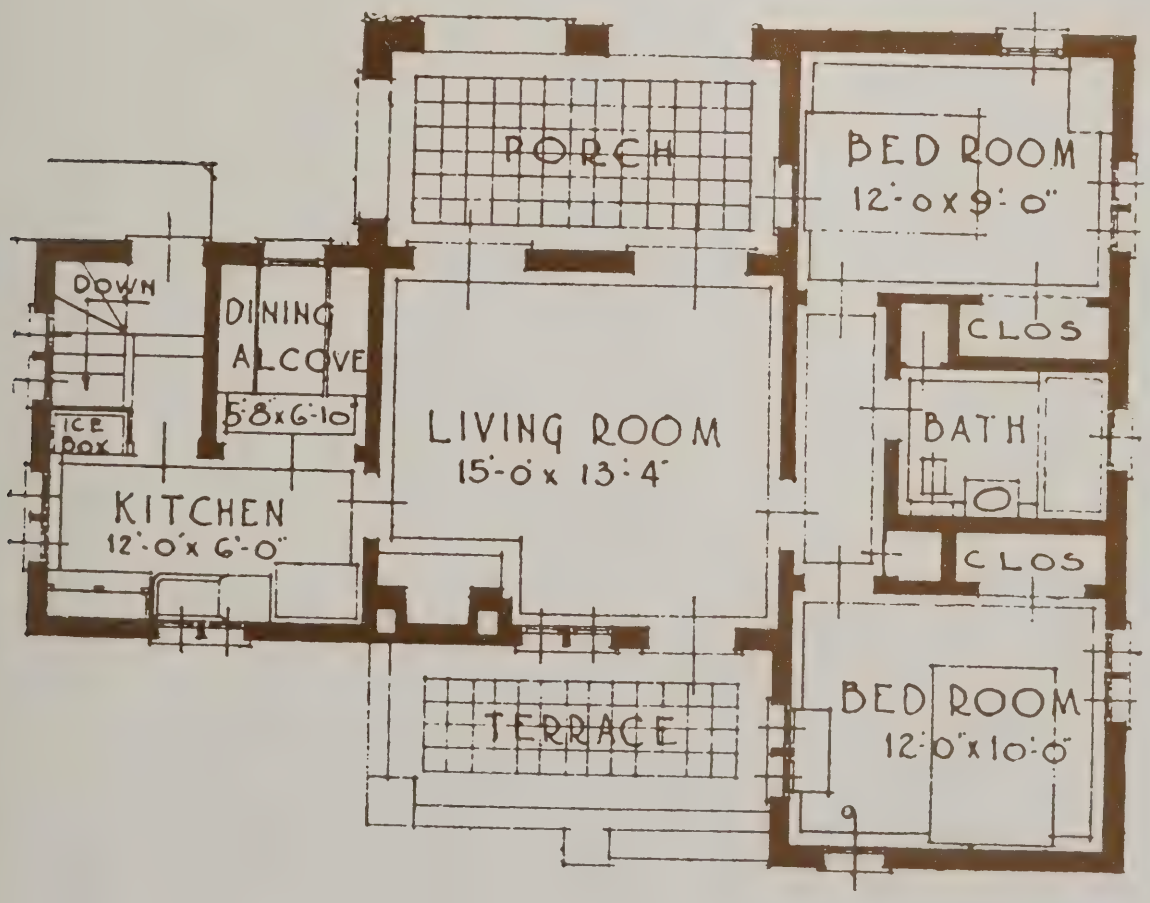


SECOND FLOOR PLAN



FIRST FLOOR PLAN

Attractive Spanish type house designed by the Mountain Division, Architects' Small House Service Bureau. Built of hollow tile and finished in white stucco. The dull green window blinds and shingles furnish a pleasing contrast to the white walls



Floor plans for the small house shown above

Plan No. P-180. Designed for the Southern Pine Association. For floor plans see following page

Plan No. E-21. Designed for the Southern Pine Association. For floor plans see following page

Southern Type Bungalows

Two Designs by the Southern Pine Association Which Illustrate the Prevailing Type of Small Southern Bungalow

THE two houses shown on the opposite page, with floor plans illustrated below, were designed for the Southern Pine Association to illustrate the possibilities of the small wood house. Each is an attractive design of the so-called "Southern Bungalow," a type of small house which seems to be growing in popularity in warmer climates.

Each house has considerable porch space, a distinctive feature of all southern residences, and it is interesting to note how this detail is handled on the two different houses. A glance at the floor plans will also show that the rooms are all good-sized, a very necessary detail in the design of any house which is to be erected in a locality where warm weather is lasting. Note also the large amount of wall space devoted to window area and the provisions for direct ventilation through the house.

While these two houses are of the same type, they differ materially in exterior design. Plan P-180 is of a somewhat formal southern type in which the entrance doorway is the dominant architectural feature. Plan E-21, on the other hand, is anything but formal in design, and makes use of the doorway only as a secondary detail.

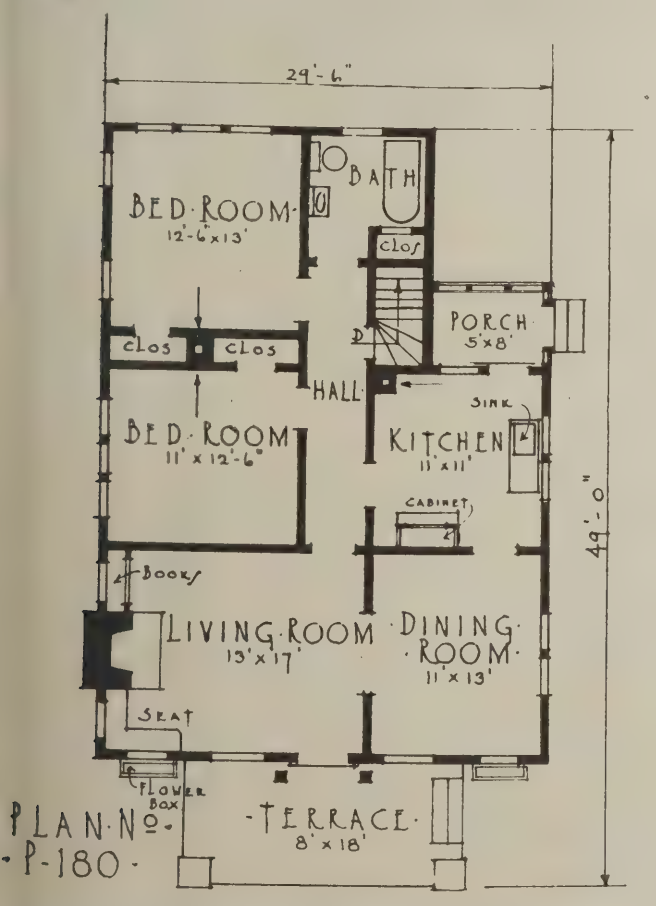
In the first design, the terrace is raised just a short distance from the grade. It is finished with stucco and trimmed with four red tile at the piers and a course of red brick at the top. The terrace floor could be either concrete or brick, depending upon the owner's preference. The chimney also contains red tile inserts.

These red tile and brick, together with a green roof and the growing plants in the window boxes, furnish the much needed touch of color so essential to relieve an otherwise severe design. The two trellis ornaments tend to break up the blank wall at the ends and may be used to furnish a base for additional color in the way of climbing vines. All windows are of the casement type.

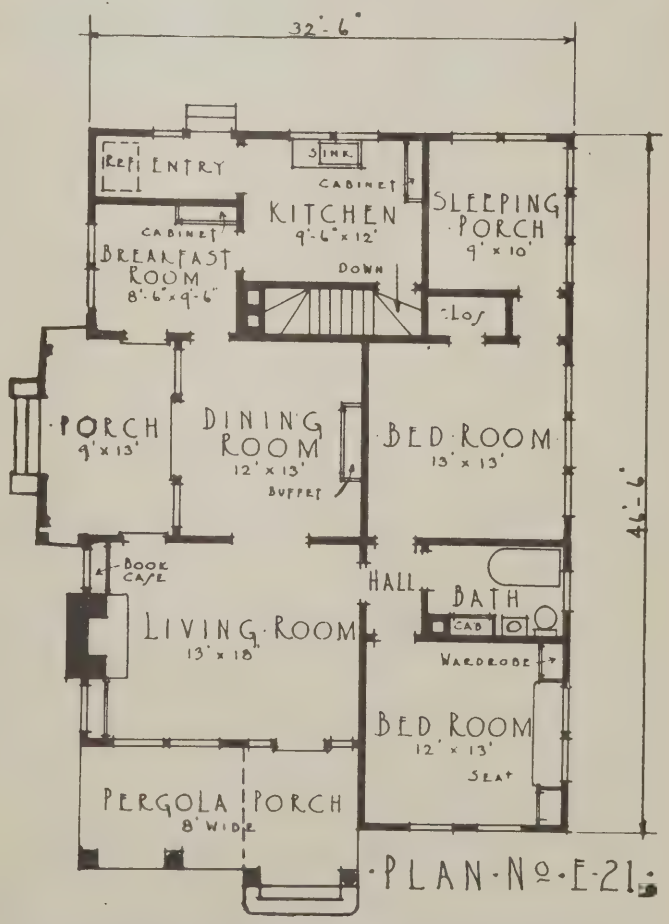
The house shown in the lower illustration has a decided appeal in its inviting, semi-sheltered terrace, arranged with columns and projecting beams somewhat after the fashion of a pergola. The terrace here should be finished in concrete, as a red brick floor might give additional color, which would, in this case, be undesirable.

The ventilators which provide air for the space between the grade and the floor joists and between the ceiling and roof joists are here utilized as ornaments and adds much to the effectiveness of the design. The roof and blinds may be painted green or red; the latter scheme makes for a very unusual and attractive appearance. The windows for this house are the double-hung type.

Both these designs are subject to wide variations and this fact may, in a measure, account for their increasing popularity. They are examples of many designs which builders may obtain through the Southern Pine Association.



Floor plan for House P-180, shown on preceding page. Designed for the Southern Pine Association



Floor plan for House E-21, shown on preceding page. Designed for the Southern Pine Association

A Modern Hog House

An Example of Up-to-Date Hog-House Construction Involving the Latest Methods of Furnishing Ventilation and Sunlight

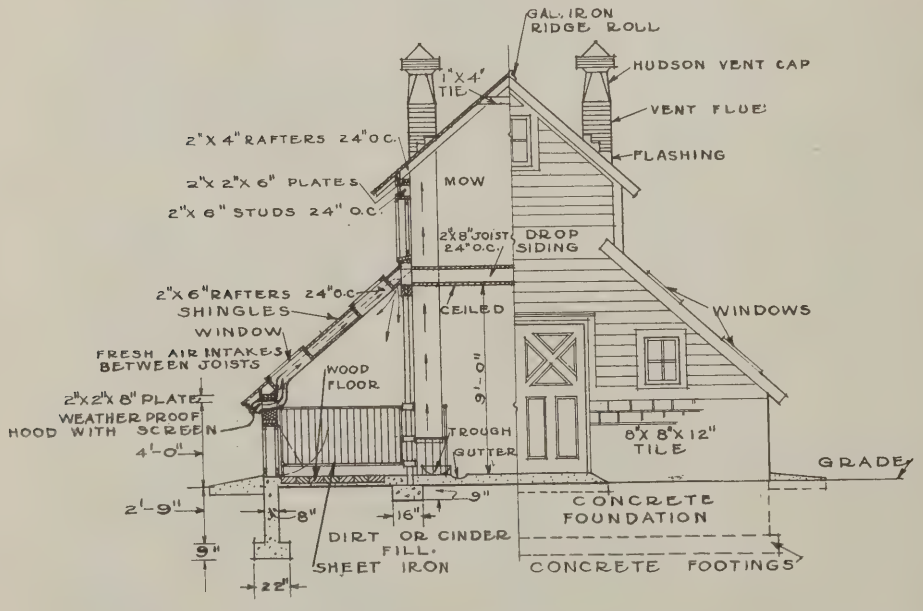
IT is a far cry from the old-fashioned pig sty to the hog house illustrated in this article, but these buildings are coming into favor, and the one shown here is typical of modern hog-house design. It is of the monitor type and was built for M. P. Mortinson of Albert Lea, Minn., at a cost of about $2500.

The main points about this design are the compactness of the whole layout and the fact that provision is made for the entrance of plenty of sunlight and ventilation. These sanitary provisions are very essential and it is a regrettable fact that they are sometimes neglected. Sunlight is one of the best germ-destroying agents known and every hog house should be so designed that as much sunlight as possible be admitted. Ventilation is also a very necessary item to be considered in the design of a hog house and it is interesting to note how the ventilating details are handled here.

Sunlight is admitted to the building by

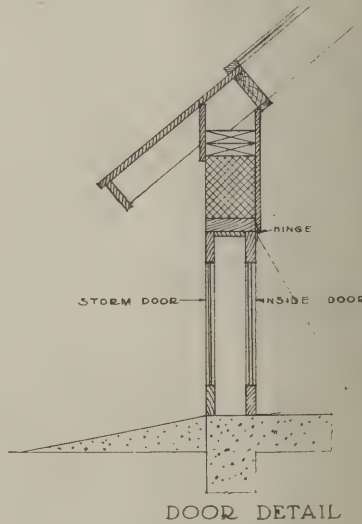
Exterior view. Note ventilating flues and location and number of windows in roof

View of interior. Note openings of fresh-air intakes in ceiling and ventilating flue in foreground



HALF CROSS SECTION HALF END FRAMING

Cross section through building showing construction details. The path of circulating air is shown by arrows entering the air intakes at the eaves and leaving the ventilating flues above the roof



DOOR DETAIL

Details of double doors and roof framing at the eaves

means of large windows placed in two tiers in that part of the roof directly over the pens, thus allowing the sunlight to fall where it is most needed. Eight fresh-air intakes are provided on each side of the feeding alley, making a total of 16 in all. These intakes have their openings for the entrance of fresh air in the roof, directly at the eaves and run between joists until the ceiling is reached. Four large ventilating flues are used to generate a draft and to cause circulation of the fresh air which is brought inside the building by the intakes. The direction of the air currents is indicated by arrows shown in the drawing of the cross section.

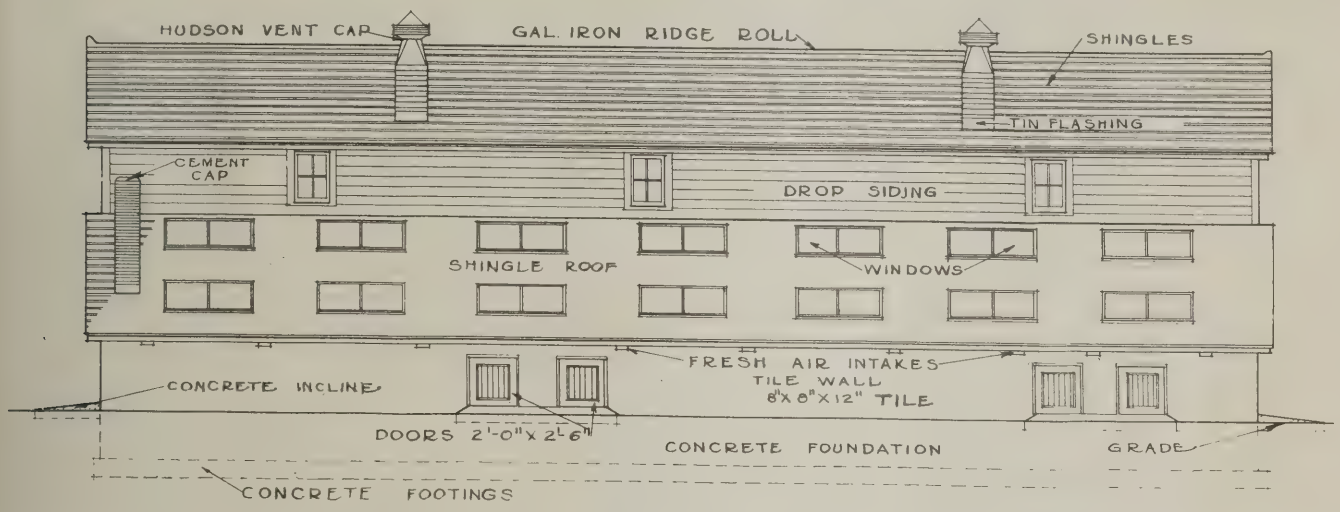
The building rests on a concrete foundation which is carried below grade far enough to prevent upheaval by frost action. Clay tile is used for the walls to the height of the lower eaves and drop siding with regulation timber framing is used for the balance. Steel columns furnish support for the mow floor and provide an unobstructed area below as shown in the accompanying illustration of the interior. The mow floor is carried on 2x8 joists, spaced 24 in. on centers, which are carried on a timber girder supported by the columns. The roof is of ordinary construction.

Aside from structural features, care was taken to provide for the health and comfort of the stock to be housed.

It is not considered good policy to allow stock to lie on a concrete floor when the weather is cold, and therefore, though a concrete floor is provided in all other parts of the ground floor, Kreolite wood blocks are laid in the pens. Steel posts and rails are used throughout and steel feeding troughs are provided.

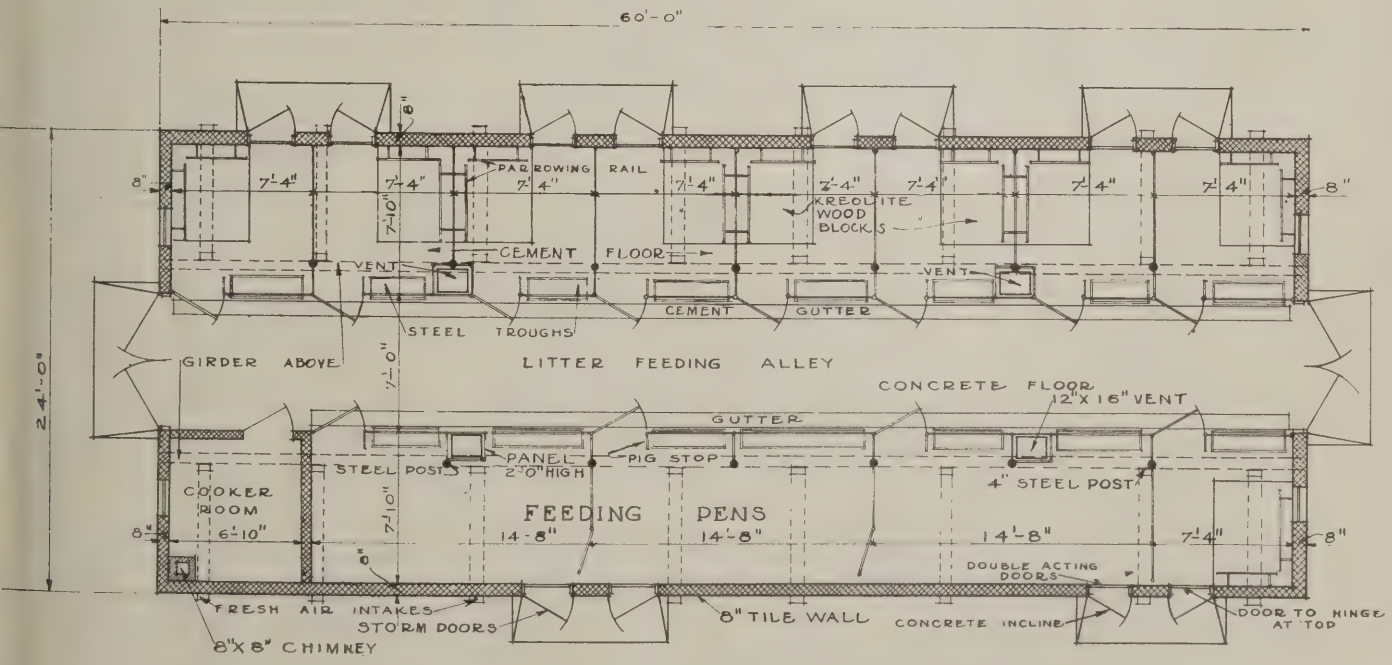
Double doors, hinged at the top, as shown in the door detail, permit entrance to the pens. A short concrete incline leads to the ground floor which has been slightly raised above the grade to facilitate drainage.

The design is by the Hudson Manufacturing Co., Minneapolis, Minn.



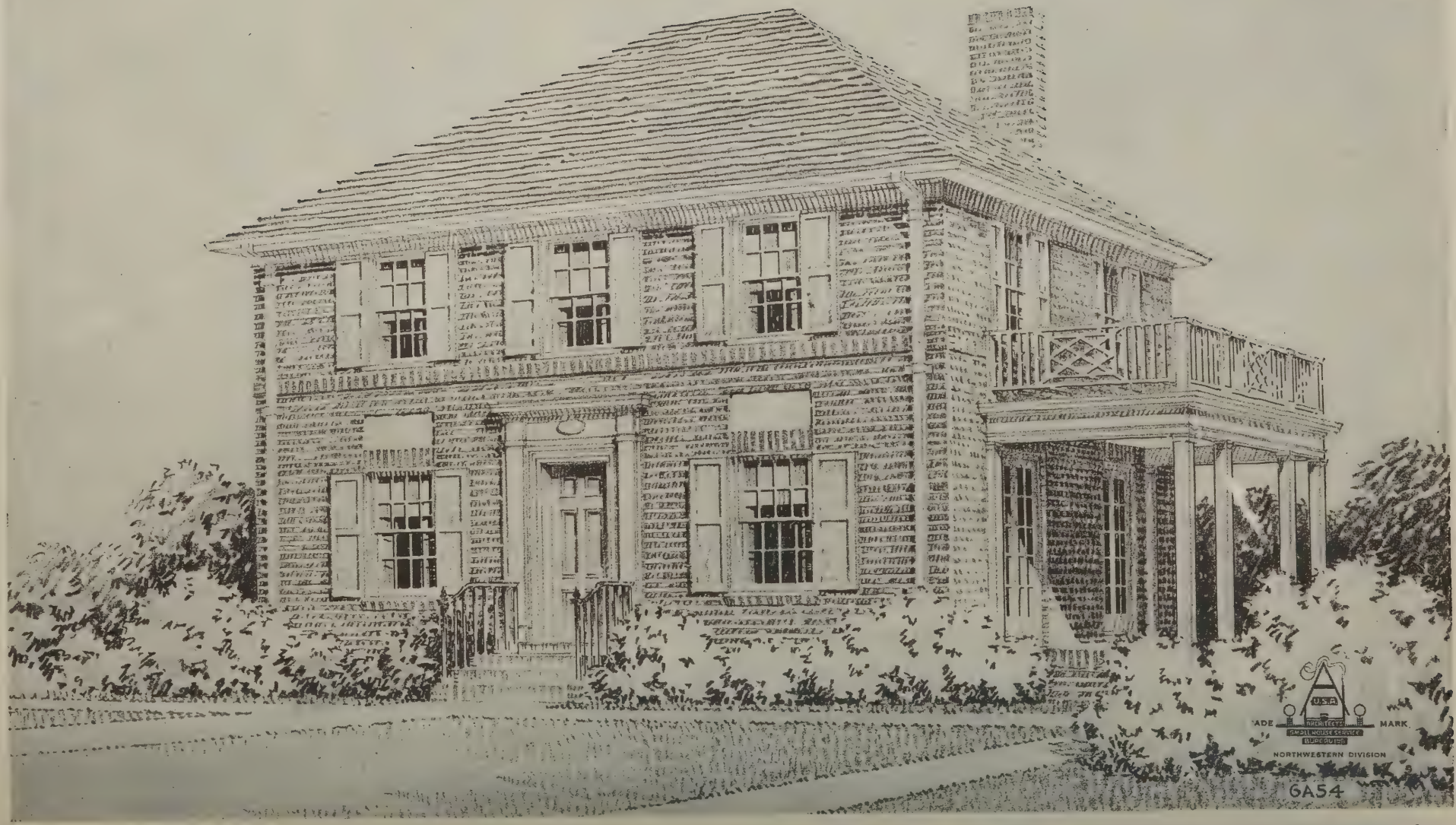
SIDE ELEVATION

Side elevation showing doors and location of windows, vent flues, and fresh-air intakes



GROUND FLOOR PLAN

Ground floor plan showing arrangement of pens and location of steel columns



City House No. 6A54, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.

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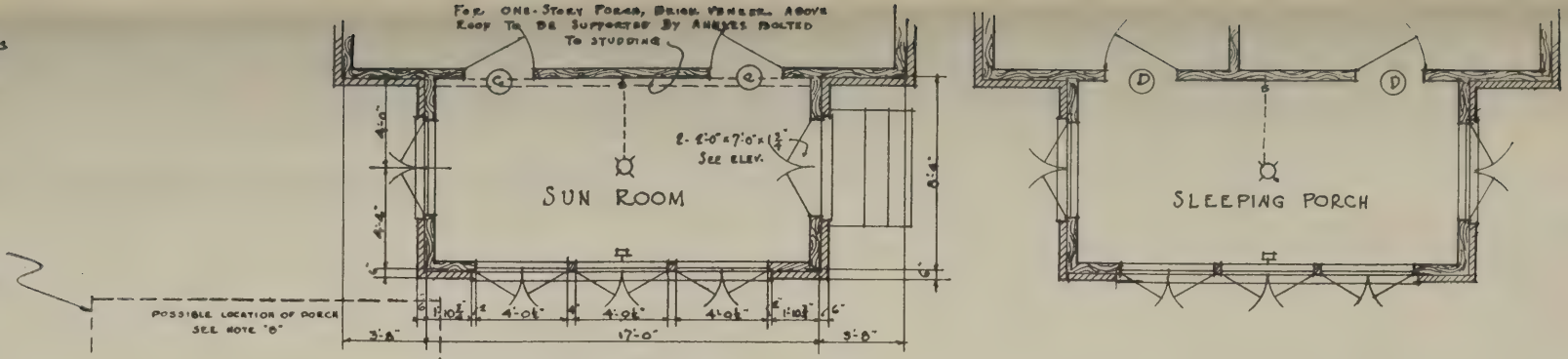
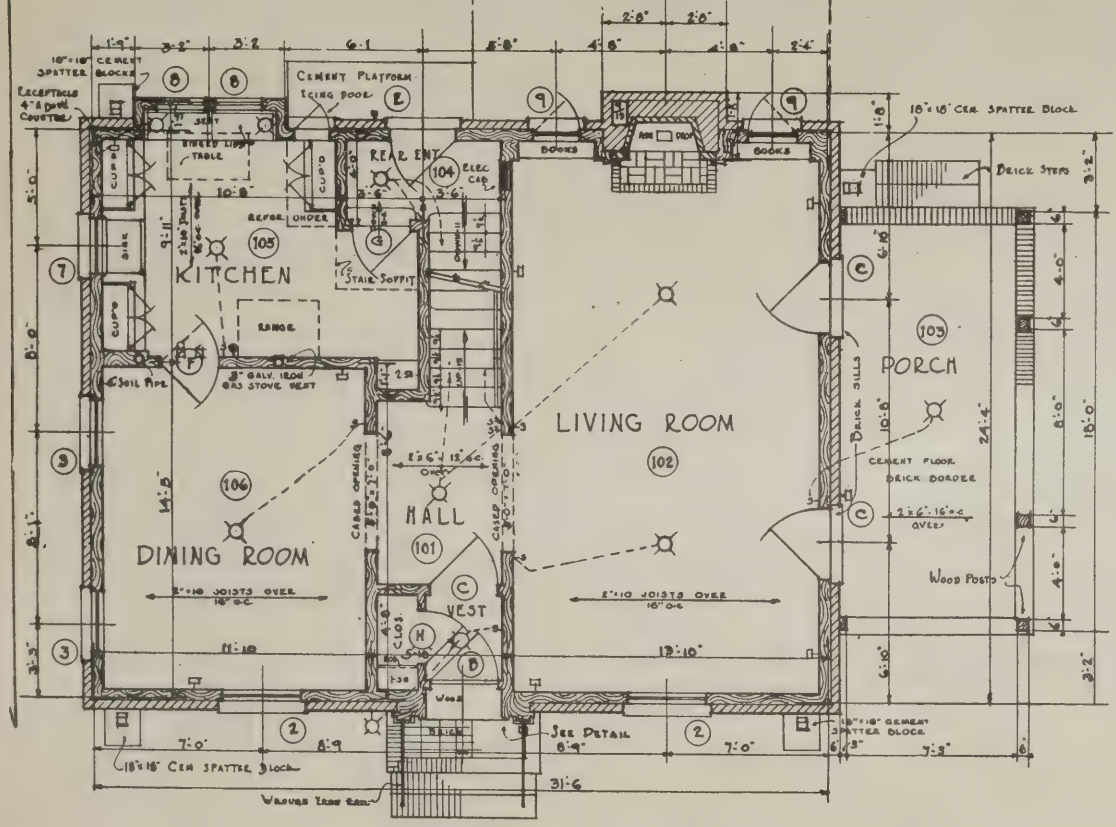
NOTE "A" - If the owner so desires the sun room, or the sun room with the sleeping porch over, may be substituted for the open porch shown with the floor plans. See alternate plans & elevations for sun room and sleeping porch.

NOTE "B" - If the owner so desires either the open porch or sunroom with sleeping porch over, may be placed here as indicated by the dotted lines. If this is done, move the fireplace to the outside wall opposite the living room entrance and make proper revisions to the door and window schedules.

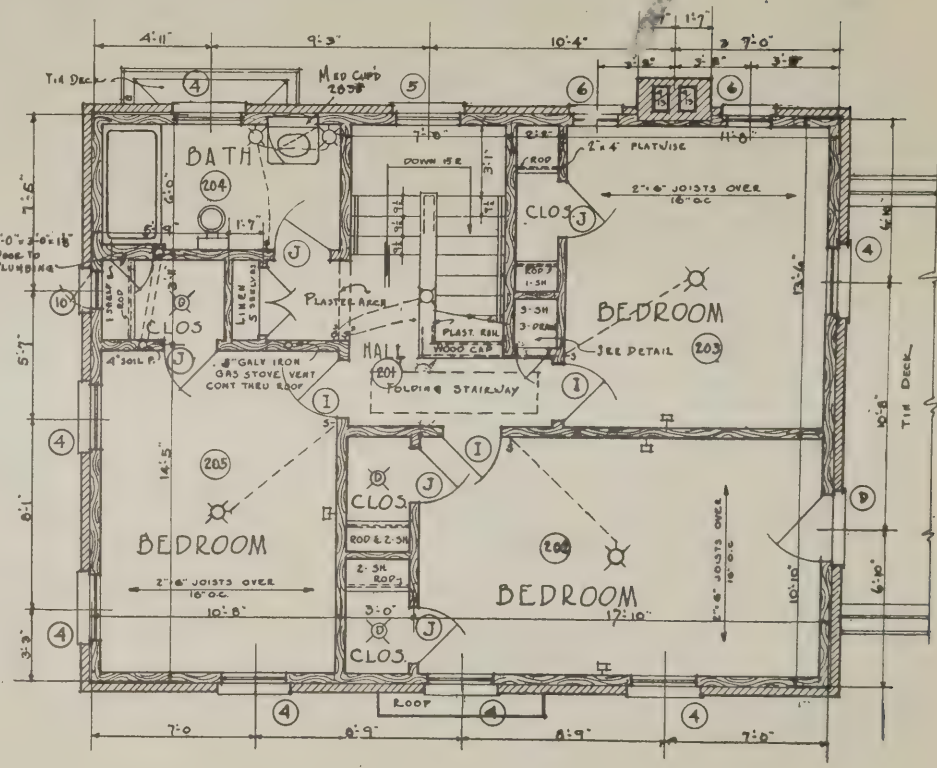

For one-story porch, brick veneer above roof to be supported by angles bolted to studding
SUN ROOM
2-2'-0" x 7'-0" x 1¾" See elev.
SLEEPING PORCH
Possible location of porch see note "B"
3'-8"
17'-0"
3'-8"

ALTERNATE PLANS FOR SUN ROOM AND SLEEPING PORCH

Scale ¼" = 1'-0" - See Note "A"



FIRST FLOOR PLAN



SECOND FLOOR PLAN

Scale ¼" = 1'-0"

0 1 2 3 4 5 6 7 8

Floor plans of House No. 6A54, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc. Copyrighted by National Builder and The Architects' Small House Service Bureau

Six-Room Colonial House No. 6A54

Designed for a 40- or 50-Foot City Lot

THIS is a six-room colonial design with a brick veneer exterior on wood-frame backing. It is designed for a lot with a 50-ft. frontage. However, if the porch is put at the rear, the house would go on a 40-ft. lot in most cities. The plans provide for several developments of the porch. There is a drawing for an open porch and one for glazing in and one for a sleeping porch if the owner wishes to have it.

This design as far as the plan arrangement goes is similar to Design 6A47, which was shown in the February issue of NATIONAL BUILDER. If you will compare these two designs you will be surprised at the great difference in appearances that comes from simply changing the materials.

The house has been made interesting through a careful use of brick and by the charming entrance doorway which is in true colonial style. The simple wrought-iron railing at the door lends an air of intimacy and charm to the house.

There is a large living room quite 13 ft. in the clear in width and nearly 24 ft. in length. The fireplace and bookcases at the end of this room make a gathering place for the family.

The kitchen is economically planned to save steps. The refrigerator, work table, sink, cupboards, and range are all located so that the housewife can do her work with the greatest ease and efficiency. Dining space has been provided in the kitchen by putting a seat in the bay window before the kitchen table.

In the second story there are three roomy bedrooms of almost equal size, with large closets, linen closets, and storage space of various kinds.

This house is designed to face west or north and should be reversed for other facings.

The regular price for this plan is $30.50. ($15.50 to NATIONAL BUILDER subscribers.)

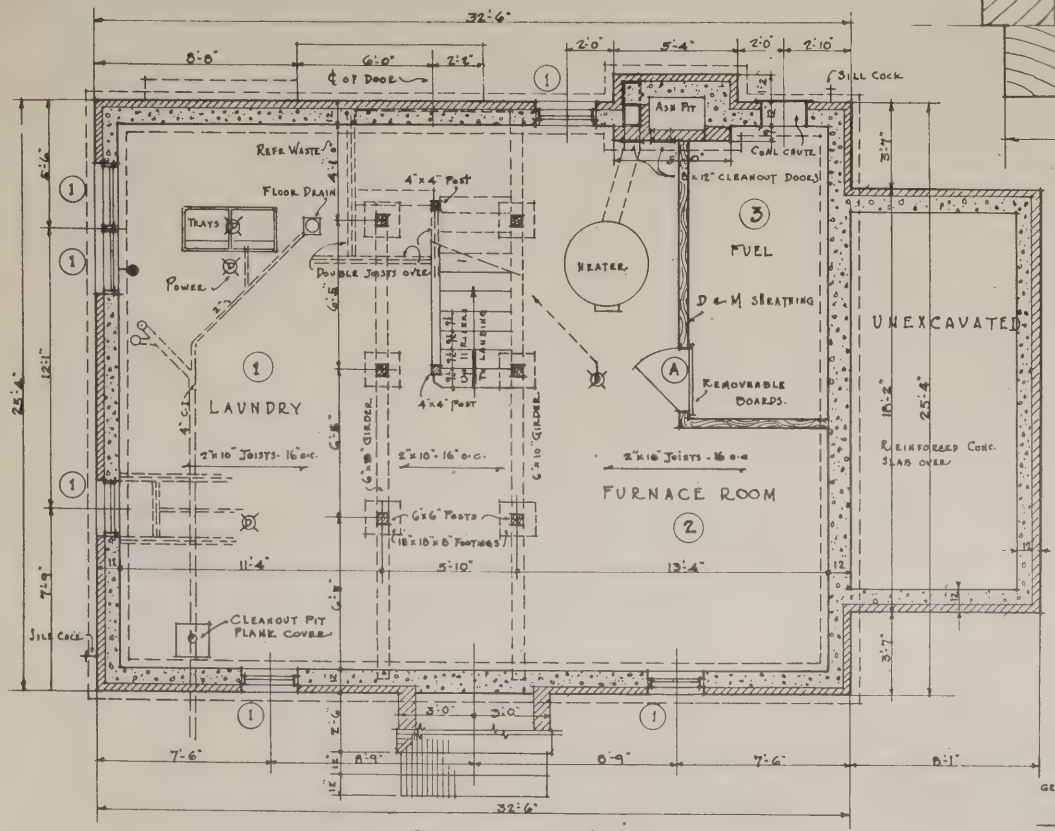
EXCAVATING—200 cu. yd.
BACKFILL—60 cu. yd.
FOUNDATION—If 12" concrete, 46 cu. yd. gravel, 178 sax cement; if 9" concrete, 35 cu. yd. gravel, 142 sax cement; if 12" tile, 22300 CBM tile, 16 cu. yd. mortar; if 9" tile, 16800 CBM tile, 13 cu. yd. mortar.
FACE BRICK—15000 face brick; 600 lb. mortar color; 9 cu. yd. mortar.
CEMENT FLOOR AND SLAB—6 cu. yd. gravel; 5½ cu. yd. sand; 71 sax cement; 4 cement spatter blocks.
CHIMNEYS—2000 common brick; 850 face brick above roof; 100 fire brick; 20 sq. ft. hearth tile; 165 inside face brick; 60 lin. ft. 8x12 flue tile; 20 lb. fire clay; 3 cu. yd. mortar; 1 cast iron ash dump; 1 throat and damper; 1 angle 4x3x 5/16-4'0; 2—8x12 cleanout doors; 3—6" adjustable thimbles; 5 yd. metal lath.
LATH—9 sq. yd. metal lath over boiler; 9800 wood lath.
PLASTER—9 sq. yd. on metal lath; 700 sq. yd. on wood lath; 20 sq. yd. Keene's cement; 2 plaster panels 1'6x4'0.
TILE FLOORS—48 sq. ft. ceramic tile; 25 lin. ft. cove base.
LUMBER—6—6x6-7 posts; 2—4x4-7 posts; 1—6x10-20 girder; 1—6x10-14 girder; 1—6x10-12 girder; 2—2x4-20 girder ribbon; 2—2x4-14 girder ribbon; 2—2x4-12 girder ribbon; 4 ft. of 2" plank cleanout cover; 3—2x10-14 stair horses; 3—2x4-18 basement partition plates; 16—2x4-7 basement partition studs; 180 ft. D & M basement partition sheathing; 20—2x10-14 first floor joists; 20—2x10-18 first floor joists; 2—2x10-14 doubles under partitions; 2—2x10-18 doubles under partitions; 4—2x10-16 headers; 300 lin. ft. 1x3 bridging; 52 lin. ft. 2x10 box sill; 900 ft. com. bds. first floor subfloor; 1100 ft. 13/16x1½ first floor finish floor; 234 lin. ft. 2x4 first floor partition plates; 70—2x4-8 first floor partition studs; 3—2x10-16 stair horses to second floor; 52 lin. ft. 1x6 ribbon; 20—2x10-14 second floor joist; 20—2x10-18 second floor joist; 2—2x10x18 second floor joist doubles; 2—2x10-14 second floor joist doubles; 3—2x10-16 headers; 4—2x12-6 opening headers bearing partition; 324 lin. ft. 2x4 second floor partition studs; 2—2x8-18 porch girder; 4—2x8-9 porch girder; 15—2x6-9 porch ceiling joist; 15—2x4-10 porch roof joist; 820 ft. com. bds. second floor subfloor; 1016 ft. 13/16x1½ second floor finish floor; 18—2x6-12 second floor ceiling joist; 14—2x6-22 second floor ceiling joist; 20—2x6-12 second floor ceiling joist; 930 ft. D & M attic floor; 4—2x6-12 headers; 330 lin. ft. 2x4 outside wall plates; 100—2x4-18 outside wall studs; 110 lin. ft. 2x4 plate under rafters; 2400 ft. shiplap wall sheathing; 300 ft. ceiling for porch and cornice; 120 ft. siding; 12—2x4-16 roof braces; 12—1x6-7 collar ties; 1—1x6-8 ridge rafter; 1100 lin. ft. grounds; 4—2x6-20 hip rafters; 53—2x4-18 rafters; 1600 ft. com. bds. roof sheathing; 11¼ M shingles; 20—2x4-16 lookouts; 15—2x4-20 scaffold and extras; 4—2x4-16 scaffold and extras; 3—2x6-16 scaffold and extras; 8—2x10-20 scaffold and extras.
MILLWORK—**Frames:** 4 single 8x10-3L-1⅜; 1 twin 8x10-3L-1⅜; 2 single 9x14-16L-1⅜; 2 single 10x14-12L-1⅜; 7 single 10x12-12L-1⅜; 1 single 10x12-12L, circle head transom 1⅜; 2 single 10x12-8L-1⅜; 1 single 8x10-12L-1⅜; 1 mullion 8x10-8L-1⅜; 2 single casements 10x12-4L-1⅜; 1 single casement 8x10-4L-1⅜; 1 mul. casement 8x10-4L-1⅜. **Windows:** 6 cellar sash 8x10-3L-1⅜; 2 windows 9x14-16L-1⅜; 2—10x14-12L-1⅜; 7—10x12-12L-1⅜; 1—10x12-12L-1⅜; 1 transom circle head 1⅜; 2 windows 10x12-8L-1⅜; 2—8x10-8L-1⅜; 1—8x10-12L-1⅜; 2 casements 10x12-4L-1⅜; 3 casements 8x10-4L-1⅜. **Storm Sash:** 6—8x10-3L-1⅛; 2—9x14-16L-1⅛; 2—10x14-12L-1⅛; 7—10x12-12L-1⅛; 1—10x12-12L-1⅛; 1 circle head 1⅛; 2—10x12-8L-1⅛; 1—8x10-12L-1⅛; 2—8x10-8L-1⅛; 2—10x12-4L-1⅛; 3—8x10-4L-1⅛. **Screens:** 6—8x10-3L-1⅛; 2—9x14-16L-1⅛; 2—10x14-12L-1⅛; 7—10x12-12L-1⅛; 1—10x12-12L-1⅛; 1 circle head 1⅛; 2—10x12-8L-1⅛; 1—8x10-12L-1⅛; 2—8x10-8L-1⅛; 2—10x12-4L-1⅛; 3—8x10-4L-1⅛. **Shutters:** 2 pr. No. 522 for windows 9x14-16L-1⅛; 2 pr. No. 522 10x14-12L-1⅛; 7 pr. No. 522 10x12-12L-1⅛; 1 pr. No. 522 10x12-12L-1⅛; 1 pr. No. 522 8x10-12L-1⅛; 1 pr. special for door 3'0x6'8-1⅜. **Outside Door Frames:** 3—3'0x7'0-1¾; 1—3'0x6'8-1¾; 1—2'8x7'0-1¾; 1 icing door frame. **Outside Doors:** 1—3'0x7'0-1¾ (No. C-109); 2—3'0x7'0-1¾ (1605); 1—3'0x6'8-1¾ (1605); 1—2'8x7'0-1¾ (753); 1 icing door. **Storm Doors:** 3—3'0x7'0-1⅛; 1—3'0x6'8-1⅛; 1—2'8x7'0-1⅛. **Screen Doors:** 3—3'0x7'0-1⅛; 1—3'0x6'8-1⅛; 1—2'8x7'0-1⅛. **Outside Millwork:** 36 lin. ft. deck rail and newels; 4 porch posts; 2 half posts; 36 lin. ft. facia and soffit for porch; 1 special entrance trim; 190 lin. ft. cornice; 10 lin. ft. facia for bay; 60 lin. ft. cove molding. **Interior Doors:** 1—2'6x 6'8-1¾ (No. 720); 1—3'0x7'0-1¾ (1605); 1—2'6x 7'0-1⅜ (1102); 1—2'6x6'6-1⅜ (1102); 1—2'4x7'0-1⅜ (1102); 3—2'6x6'8-1⅜ (1102); 5—2'4x6'8-1⅜ (1102). **Jambs:** 1—2'6x6'8; 1—3'0x7'0; 1—2'6x7'0; 1—2'6x6'6; 1—2'4x7'0; 3—2'6x6'8; 5—2'4x6'8; 2—5'0x7'0. **Interior Trim:** 4 sides single 8x10-3L; 1 side twin 8x10-3L; 2 sides single 9x 14-16L; 2 sides single 10x14-12L; 7 sides single 10x12-12L; 1 side single 10x12-12L circle top transom; 2 sides single 10x12-8L; 1 side single 8x10-12L; 1 side mul. 8x10-8L; 2 sides single casement 10x12-4L; 1 side single casement 8x10-4L; 1 single mul. casement 8x10-4L; 3 sides door 3'0x7'0; 1 side door 3'0x6'8; 1 side door 2'8x7'0; 1 side icing door; 2 sides door 2'6x6'8; 2 sides door 3'0x7'0; 2 sides door 2'6x7'0; 2 sides door 2'6x6'6; 2 sides door 2'4x7'0; 6 sides door 2'6x 6'8; 10 side door 2'4x6'8; 4 sides opening 5'0x7'0; 1 flight grade stairs; 1 flight basement stairs with rail; 1 flight main stairs with rail; 1 flight folding stairs; 1 medicine cabinet No. 2835; 1 linen closet; 1 utility door; 1 utility door jamb; 1 side trim utility door; 1 mantel shelf; 2 bookcases; 1 meter cabinet; 1—2'6 kitchen cupboard; 1—5'6 seat; 1 hinged table; 2—3'0 kitchen cupboards with worktable; 490 lin. ft. base; 490 lin. ft. base shoe; 490 lin. ft. base molding; 310 lin. ft. picture molding; 158 lin. ft. ceiling cove; 40 lin. ft. closet shelving; 20 lin. ft. closet hook strip; 20 lin. ft. closet clothes pole; 32 lin. ft. band molding; 18 lin. ft. threshold; 1 hall cabinet with three drawers. **Note:** If dining room, hall and living room trim is changed, it will affect the following millwork: 1 door 3'0x7'0-1¾ (No. C109); 1 side trim 3'0x7'0; 3 doors 3'0x7'0-1¾ (1605); 1 jamb 3'0x 7'0; 4 side trim 3'0x7'0; 1 door 2'4x7'0-1⅜ (1102); 1 jamb 2'4x7'0; 1 side trim 2'4x7'0; 2 jambs 5'0x 7'0; 4 side trim 5'0x7'0; 1 flight main stairs with first floor rail; 1 mantel shelf; 2 bookcases; 2 sides window trim 9x14-16L; 2 sides window trim 10x14-12L; 2 sides casement trim 10x12-4L; 158 lin. ft. ceiling cove; 130 lin. ft. base; 130 lin. ft. base shoe; 130 lin. ft. base molding; 158 lin. ft. picture molding; 830 ft. 13/16x1½ finish floor.
TINWORK—160 lin. ft. gutter; 6 miters; 2 gutter ends; 4 nipples; 4 strainers; 4 offsets; 4 elbows; 4 shutoffs; 80 lin. ft. conductor; 12 conductor hooks; 50 gutter hangers; 220 sq. ft. tin deck; 8 lin. ft. ridge roll; 2 finials; 80 lin. ft. hip roll; 1 saddle; 12 lin. ft. chimney flashing; 200 tin shingles.
ORNAMENTAL IRON—2 rails 5'0x2'6.
HARDWARE—6 cellar sash sets; 17 sash locks; 17 sash lifts; 5 casement sash set; 29 storm sash set; 29 screen set; 14 shutter sets for pairs; 3 front door sets with butts; 1 rear door set with butts; 1 icing door set with butts; 5 storm door sets with butts; 5 screen door sets with butts; 1 floor hinge; 2 push plates; 12 inside door sets with butts; 4 doz. clothes hooks; 4 stair rail brackets; 19 door bumpers; 1 coal chute; 1000 lb. assorted nails; 6 lb. assorted brads; 510 lb. sash weights; 4 hanks sash cord; 1 set hardware for folding stairs; (medicine cabinet: 1 pr. ornamental butts, 1 cupboard turn); (linen closet: 2 pr. ornamental butts, 1 cupboard turn, 1 blind catch); 4 friction stays, utility door; (meter cabinet: 1 pr. ornamental butts, 1 cupboard turn); (refrigerator cabinet: 1 cupboard turn, 2 pr. ornamental butts, 1 blind catch); 1 pr. hinges for seat; (kitchen cabinets: 6 pr. ornamental butts, 3 cupboard turns, 3 blind catches, 8 drawer pulls, 1 set castors for bin, 1 bin pull); (hall cabinet: 1 pr. ornamental butts, 1 cupboard turn, 6 drawer pulls).
WEATHER STRIPPING—6 cellar sash 8x10-3L; 2 windows 9x14-16L; 2 windows 10x14-12L; 8 windows 10x12-12L; 2 windows 10x12-8L; 1 window 8x10-12L; 2 windows 8x10-8L; 2 casements 10x12-4L; 3 casements 8x10-4L; 3 doors 3'0x7'0; 1 door 3'0x6'8; 1 door 2'8x7'0.
CAULKING—22 single frames; 3 mullion frames; 5 door frames; 1 icing frame; 1 coal chute.
INSULATION—3 rolls felt for floors; 4 rolls felt for walls; 3 rolls felt for roof; 1700 ft. of ½" insulation for walls; 750 ft. of ½" insulation for second floor ceiling.
EXTERIOR PAINTING—5 gal. trim paint; 1 gal. boiled oil; 33 gal. shingle stain; 1 gal. metallic paint; 1 gal. porch ceiling paint; 1 gal. screen paint; 1 gal. sash paint; ½ gal. shutter paint; 1 gal. japan; 10 lb. putty.
INTERIOR PAINTING—13 gal. white paint; 7 gal. enamel; 5 gal. filler stain; 3 gal. shellac; 9 gal. interior varnish; 3 gal. floor shellac; 6 gal. floor varnish; 2 gal. oil; 1 gal. japan; 1 gal. turpentine; 1 gal. alcohol; 3 lb. steel wool.
LINTELS—Steel lintels for 1 coal chute; 4 frames 8x10-3L; 1 twin frame 8x10-3L; 2 frames 10x12-4L; 1 mullion frame 8x10-8L; 2 single frames 10x14-12L; 1 single frame 8x10-12L; 1 door frame 2'8x7'0; 3 door frames 3'0x7'0; 2 single frames 9x14-16L.
REINFORCING STEEL—36—⅜ rods 8'0; 5—½ rods 17'0.

SCHEDULE OF DOORS.

QUANTITY	TYPE	SIZE	DESCRIPTION	REMARKS
1	A	2'-6"x6'-8"x1⅜"	UNIV. #7120	FUEL RM.
1	B	3'-0"x7'-0"x1¾"	CURTIS C-109	FRONT
3	C	3'-0"x7'-0"x1¾"	UNIV. #1605	VEST. & PORCH
1	D	3'-0"x6'-8"x1¾"	" #1605	TO BALCONY
1	E	2'-8"x7'-0"x1¾"	" #753	REAR
1	F	2'-6"x7'-0"x1⅜"	" #1102	INTERIOR
1	G	2'-6"x6'-6"x1⅜"	" "	"
1	H	2'-4"x7'-0"x1⅜"	" "	"
3	I	2'-6"x6'-8"x1⅜"	" "	"
5	J	2'-4"x6'-8"		

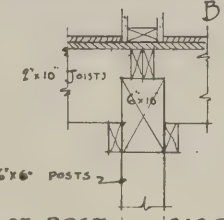
SCHEDULE OF WINDOWS.

QUANTITY	TYPE	DESCRIPTION	NO. OF LIGHTS	SIZE OF GLASS	SIZE OF FRAME	THICKNESS SASH	FRAME
6	1	BASEMENT	3	8x10	2'-4"x1'-3"	1⅜	SEE DETAIL
2	2	DOUBLE HUNG	16	9x14	3'-4⅞"x5'-2"	1⅜	" "
2	3	" "	12	10x14	2'-10½"x5'-2"	1⅜	" "
7	4	" "	12	10x12	2'-10½"x4'-6"	1⅜	" "
1	5	" FIXED TRANS	12	10x12	2'-10½"x4'-6"	1⅜	" "
2	6	DOUBLE HUNG	8	10x12	2'-0½"x4'-6"	1⅜	" "
1	7	" "	12	8x10	2'-4"x3'-10"	1⅜	" "
2	8	" "	8	8x10	1'-8½"x3'-10"	1⅜	" "
2	9	CASEMENT	4	10x12	2'-0¼"x2'-5"	1⅜	" "
3	10	"	4	8x10	1'-8½"x2'-1"	1⅜	" "



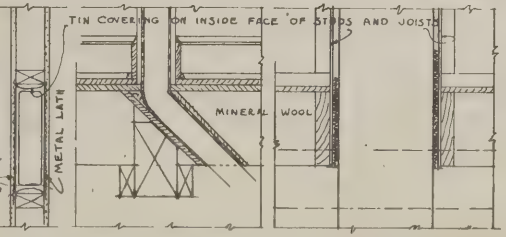
BASEMENT PLAN

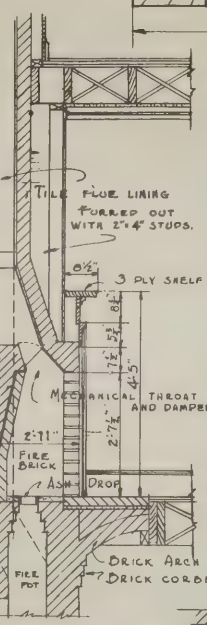
SCALE ¼" = 1'-0"



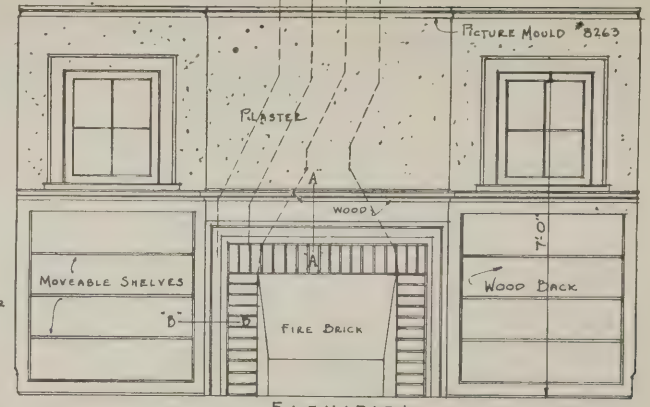
DETAIL OF POST AND GIRDER SCALE 1" = 1'-0"

IN CASE HOT AIR FURNACE AND PIPING ARE USED, THIS CONSTRUCTION OF FIRESTOPPING AROUND PIPES PASSING BETWEEN FLOOR JOISTS AND STUDS IS RECOMMENDED

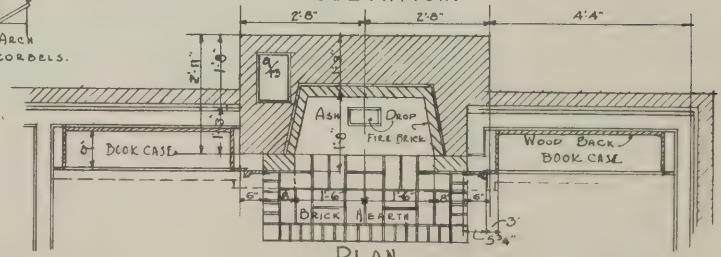




SECTION.



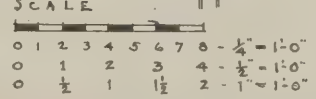
ELEVATION.

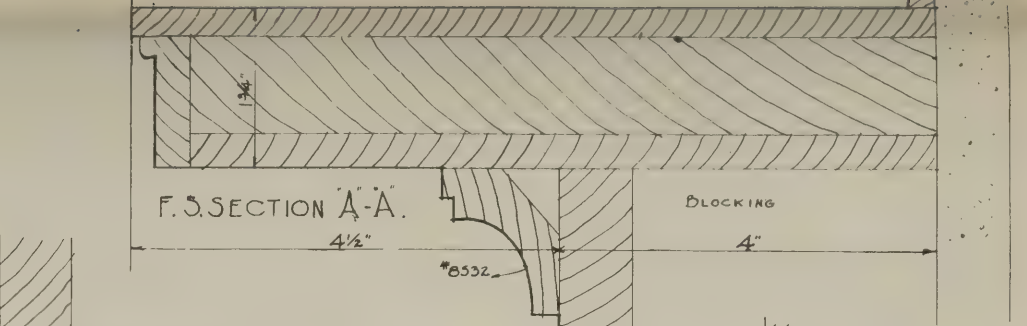


PLAN.

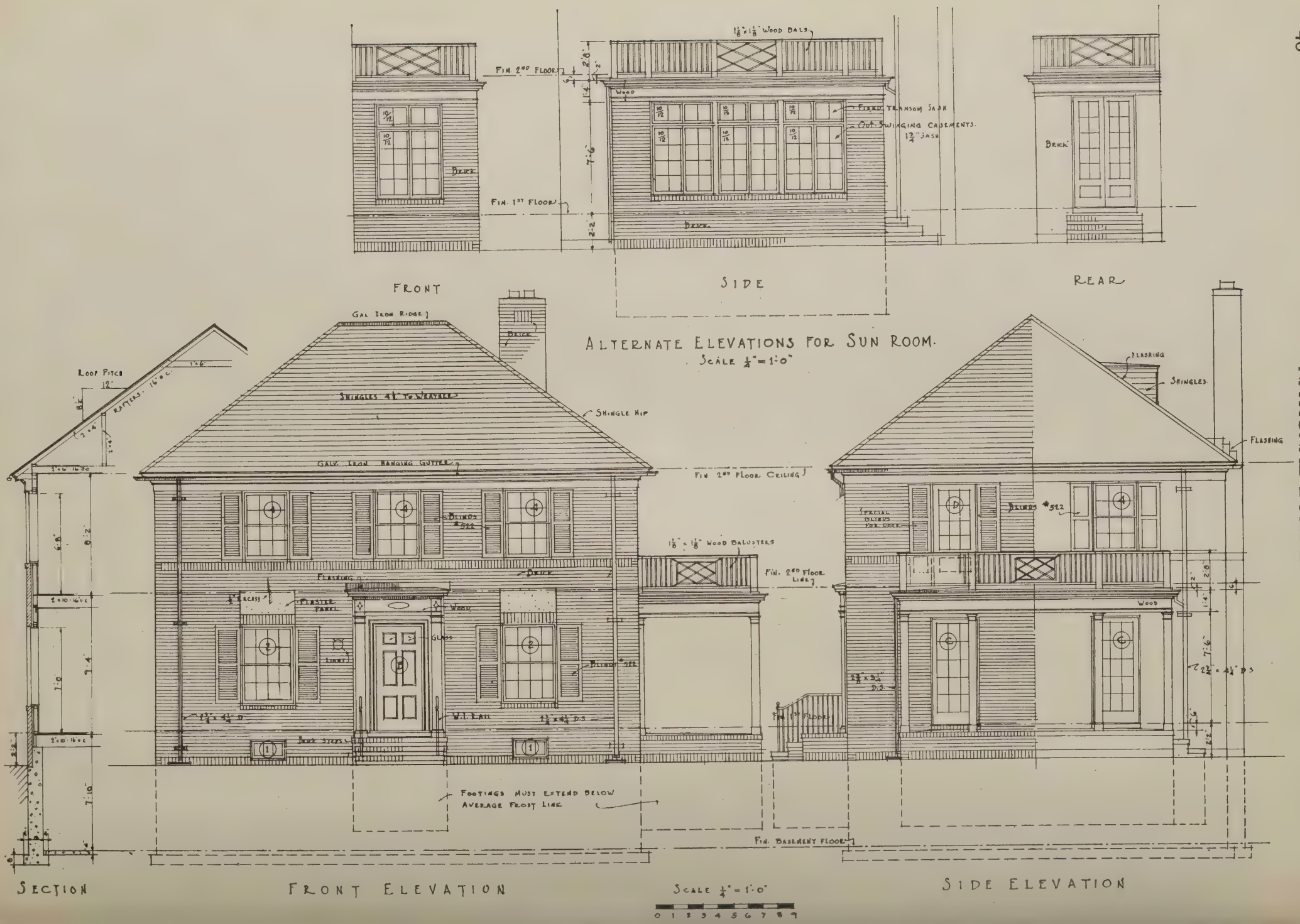
DETAILS OF FIREPLACE.

SCALE ½" = 1'-0"





Basement plan and details of House No. 6A54. Copyrighted by National Builder and The Architects' Small House Service Bureau


FRONT
SIDE
REAR
ALTERNATE ELEVATIONS FOR SUN ROOM.
SCALE 1/4"=1'-0"
SECTION
FRONT ELEVATION
SIDE ELEVATION
SCALE 1/4"=1'-0"
FIN. 2ND FLOOR
FIN. 1ST FLOOR
BRICK
WOOD
FIXED TRANSOM SASH
OUT SWINGING CASEMENTS. 12" SASH
1 1/8" x 1 1/8" WOOD BALS.
GAL IRON RIDGE
SHINGLES 4" TO WEATHER
SHINGLE HIP
GALV. IRON HANGING GUTTER
FIN 2ND FLOOR CEILING
FIN. 2ND FLOOR LINE
FIN. 1ST FLOOR
FIN. BASEMENT FLOOR
FLASHING
SHINGLES
FLASHING
ROOF PITCH 12"
RAFTERS 16" O.C.
FOOTINGS MUST EXTEND BELOW AVERAGE FROST LINE

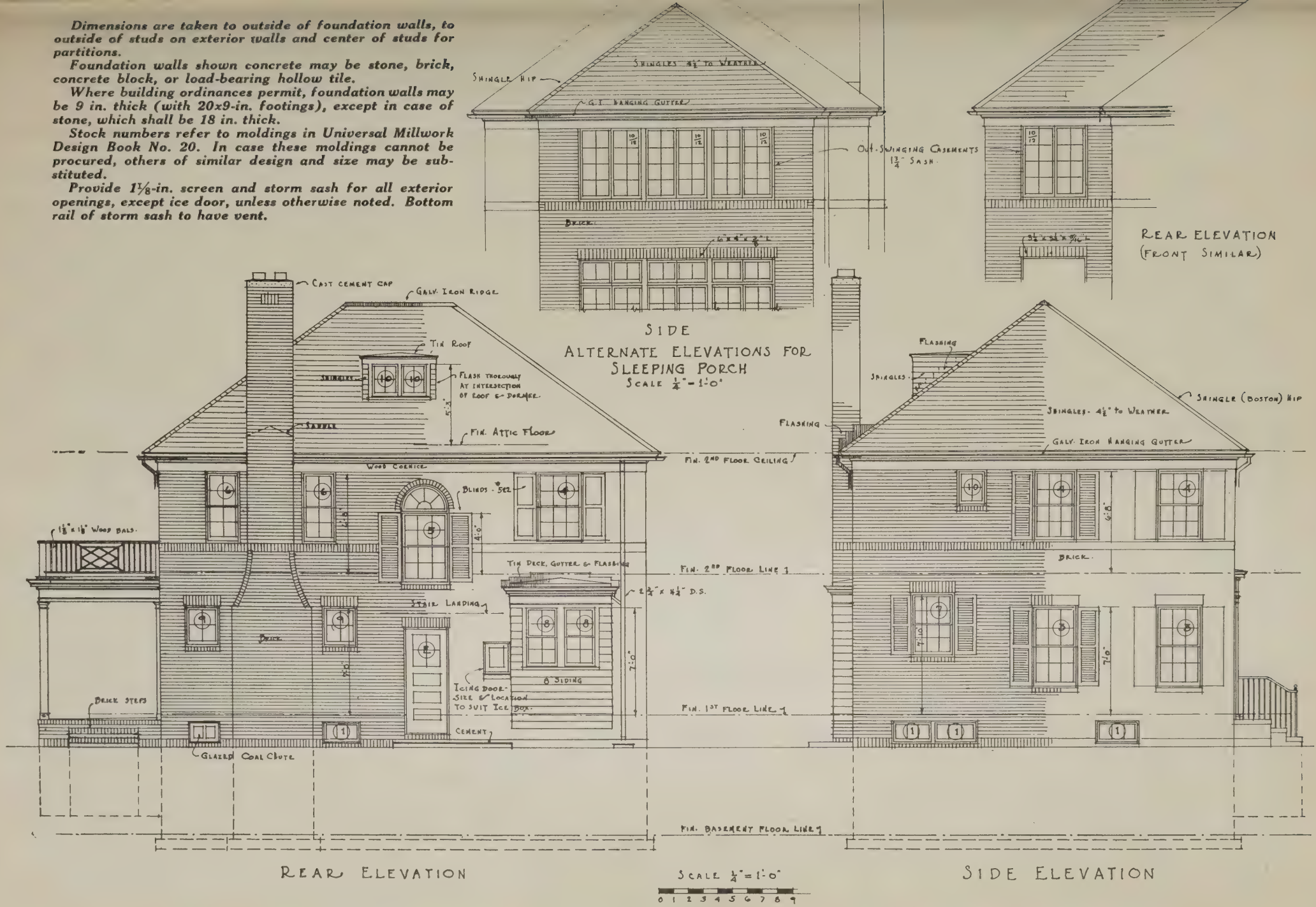
Dimensions are taken to outside of foundation walls, to outside of studs on exterior walls and center of studs for partitions.

Foundation walls shown concrete may be stone, brick, concrete block, or load-bearing hollow tile.

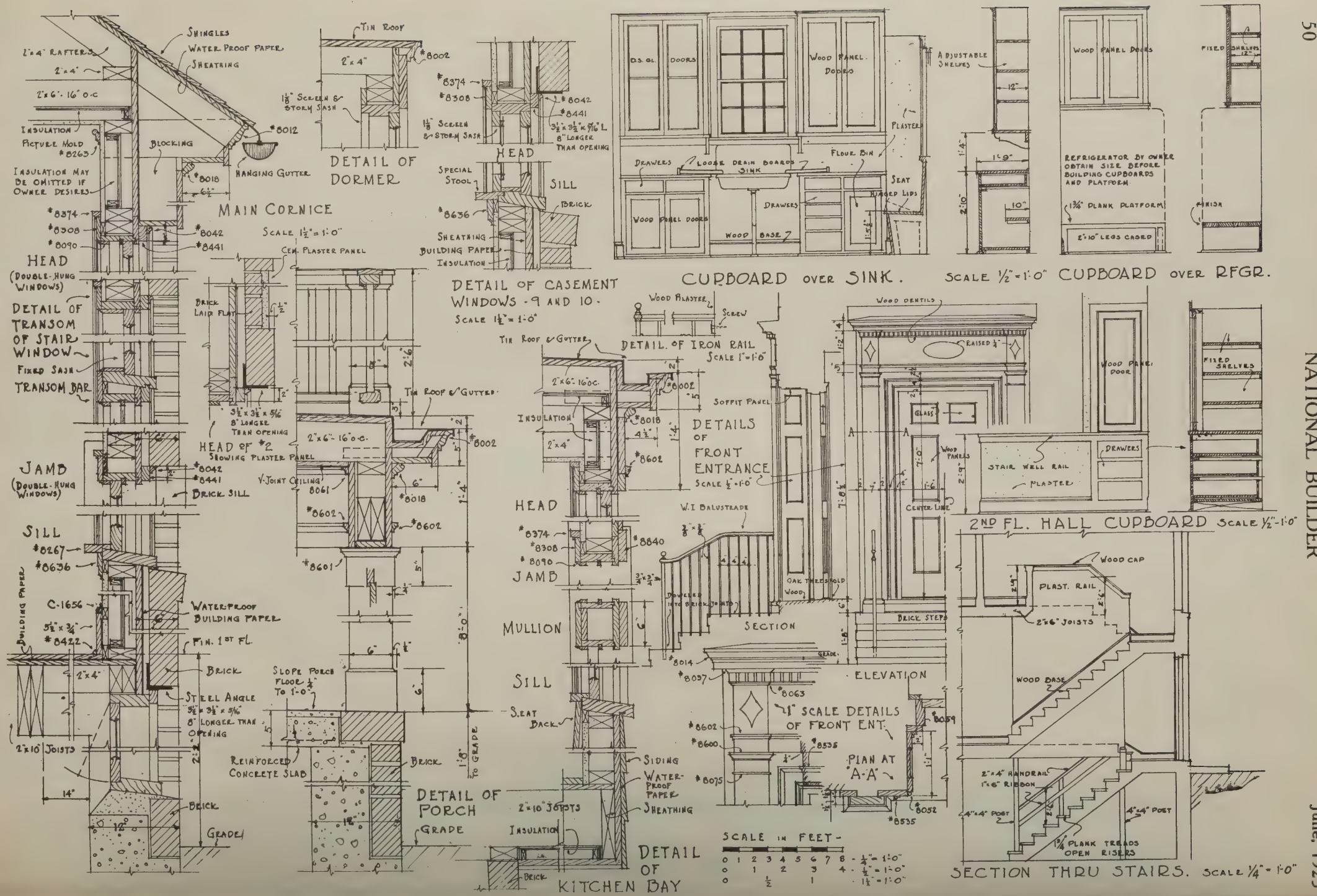
Where building ordinances permit, foundation walls may be 9 in. thick (with 20x9-in. footings), except in case of stone, which shall be 18 in. thick.

Stock numbers refer to moldings in Universal Millwork Design Book No. 20. In case these moldings cannot be procured, others of similar design and size may be substituted.

Provide 1⅛-in. screen and storm sash for all exterior openings, except ice door, unless otherwise noted. Bottom rail of storm sash to have vent.



Rear and side elevations of House No. 6A54. Copyrighted by National Builder and The Architects' Small House Service Bureau


SHINGLES
WATER PROOF PAPER
SHEATHING
2"x4" RAFTERS
2"x4"
2"x6"-16" O.C.
INSULATION
PICTURE MOLD #8263
BLOCKING
#8012
HANGING GUTTER
INSULATION MAY BE OMITTED IF OWNER DESIRES
#8018
6½"
MAIN CORNICE
SCALE 1½"=1'-0"
#8374
#8308
#8090
#8042
#8441
HEAD (DOUBLE-HUNG WINDOWS)
DETAIL OF TRANSOM OF STAIR WINDOW
FIXED SASH
TRANSOM BAR
JAMB (DOUBLE-HUNG WINDOWS)
BRICK SILL
SILL
#8267
#8636
BUILDING PAPER
C-1656
5½"x¾"
#8422
WATER-PROOF BUILDING PAPER
FIN. 1ST FL.
BRICK
2"x4"
STEEL ANGLE 3½"x3½"x5/16" 8" LONGER THAN OPENING
2"x10" JOISTS
14"
12"
BRICK
GRADE
TIN ROOF
2"x4"
1⅛" SCREEN & STORM SASH
#8002
DETAIL OF DORMER
#8374
#8308
#8042
#8441
3½"x3½"x5/16" L 8" LONGER THAN OPENING
1⅛" SCREEN & STORM SASH
HEAD
SPECIAL STOOL
SILL
BRICK
#8636
SHEATHING
BUILDING PAPER
INSULATION
DETAIL OF CASEMENT WINDOWS -9 AND 10-
SCALE 1½"=1'-0"
CEM. PLASTER PANEL
BRICK LAID FLAT
1½"
3½"x3½"x5/16" 8" LONGER THAN OPENING
HEAD OF #2 SHOWING PLASTER PANEL
2"x6"-16" O.C.
V-JOINT CEILING
8061
#8602
#8601
#8018
#8002
TIN ROOF & GUTTER
2'-6"
5"
6"
1'-4"
8'-0"
5"
6"
6"
SLOPE PORCH FLOOR ½" TO 1'-0"
REINFORCED CONCRETE SLAB
BRICK
1'-8" TO GRADE
DETAIL OF PORCH
GRADE
D.S. OL DOORS
WOOD PANEL DOORS
DRAWERS
LOOSE DRAIN BOARDS
SINK
FLOUR BIN
PLASTER
SEAT HINGED UP
WOOD PANEL DOORS
DRAWERS
WOOD BASE
ADJUSTABLE SHELVES
12"
1'-9"
10"
2'-10"
CUPBOARD over SINK.
WOOD PANEL DOORS
REFRIGERATOR BY OWNER OBTAIN SIZE BEFORE BUILDING CUPBOARDS AND PLATFORM
1¾" PLANK PLATFORM
2'-10" LEGS CASED
FIXED SHELVES
12"
FINISH
SCALE ½"=1'-0" CUPBOARD over RFGR.
WOOD PILASTER
SCREW
DETAIL OF IRON RAIL
SCALE 1"=1'-0"
TIN ROOF & GUTTER
2"x6"-16" O.C.
INSULATION
2"x4"
#8018
#8002
SOFFIT PANEL
#8602
DETAILS OF FRONT ENTRANCE
SCALE ½"=1'-0"
HEAD
#8374
#8308
#8090
JAMB
MULLION
SILL
SEAT BACK
SIDING
WATER-PROOF PAPER
SHEATHING
2"x10" JOISTS
INSULATION
BRICK
DETAIL OF KITCHEN BAY
W.I BALUSTRADE
¾"x¾"
#8840
DOWELED INTO BRICK JOINTS
OAK THRESHOLD
WOOD
BRICK STEPS
SECTION
GRADE
ELEVATION
#8014
#8037
#8063
1" SCALE DETAILS OF FRONT ENT.
#8602
#8600
#8535
#8075
#8059
#8052
#8535
PLAN AT "A-A"
SCALE IN FEET-
0 1 2 3 4 5 6 7 8 - ¼"=1'-0"
0 1 2 3 4 - ½"=1'-0"
0 ½ 1 - 1½"=1'-0"
WOOD DENTILS
RAISED ¾"
WOOD PANEL DOOR
GLASS
WOOD PANELS
STAIR WELL RAIL
PLASTER
DRAWERS
CENTER LINE
FIXED SHELVES
2ND FL. HALL CUPBOARD SCALE ½"=1'-0"
WOOD CAP
PLAST. RAIL
2'-6"
2"x6" JOISTS
WOOD BASE
2"x4" HANDRAIL
1"x6" RIBBON
4"x4" POST
4"x4" POST
1¼" PLANK TREADS OPEN RISERS
SECTION THRU STAIRS. SCALE ¼"=1'-0"

Store-Front Construction

I. Introduction—Essentials of Up-to-Date Store Building

By Roy M. Singer
Associate Editor, National Builder

BECAUSE of many inquiries received from our readers, and because of the general interest in the subject, commencing in this issue, "National Builder" will publish a series of articles dealing with store fronts and store-front construction. Every phase of the subject will be treated and every type of store-front construction will be described. The design of an attractive front will be explained and the application of the various types of fronts to specific businesses will be shown.

Brick, stone, terra-cotta and other fronts will be illustrated and details will be shown for the installation of wood, steel, and copper construction. It is intended to make this series of articles cyclopedic in its scope, and to assist us, several manufacturers of store front accessories have placed the entire resources of their engineering departments at our disposal and will be glad to answer questions.

It is not intended to treat the subject from the standpoint of design, for such work properly belongs to the architect and should not be attempted by the builder. Such information given here as deals with the plan layout of various store fronts is given only to guide the builder in his work and to give him a better understanding of the reasons for the various store front types and plan layouts.

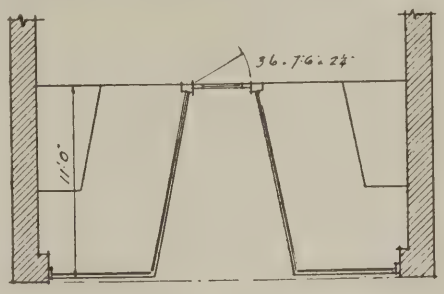
IT has been said that at no time has competition among retailers been as keen as it is today. This means that every retailer today is confronted with the same problem —how to attract more customers to his store. There are many ways to accomplish this end, such as advertising, giving away premiums, establishing special sales, and several other schemes, but a sure and ef-

An attractive and inviting store front built especially for the display of clothing. This picture was taken at night and illustrates the pleasing effects obtainable when all illuminating units are concealed

fective method of placing retail wares before prospective customers and arousing their interest in the goods displayed is by means of an attractive store front.

There are profitable possibilities in store-front construction for the contractor. Store-front construction, however, is no different from any other kind of construction when viewed from a profit standpoint. It presents problems of a special class, it requires ingenuity on the part of the man in charge of the work, it demands the exercise of good taste and the use of builder's skill, and it may as readily run into a loss, if incorrectly handled, as any other kind of contracting work. In short, store-front construction is a builder's work, and if it is to be carried on successfully and made to produce a profit it must be treated as such.

In large towns it is possible for a contractor to become a store-front specialist and to deal only in store-front work, but the average town does not favor such an arrangement. For the contractor in the average town, however, this class of construction offers an attractive adjunct to his regular work and may be utilized as a means of keeping an organization together when work is slack.



Plan of the new store front shown below

A well-designed store front requires first of all a knowledge of the display needs of the kind of merchandise for which the store front is to be built. It is obvious that the requirements for a drug-store show window are different from those for a furniture-store window, and inasmuch as few contractors know what these requirements are or how to care for them, this part of the design is best handled by an architect and will be only briefly treated here.

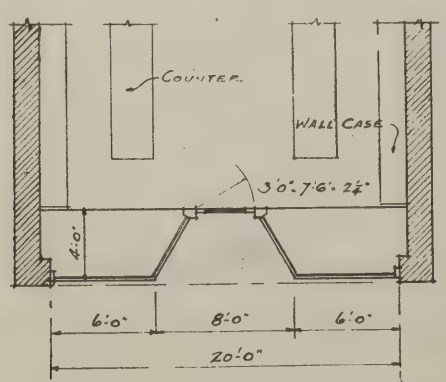
The question of materials offers another problem. There is no wisdom in building a more expensive front that is essential, and it should be borne in mind that it is not necessary to use expensive materials in order to secure an attractive front. The beauty of a store front lies not so much with the *kind* of materials used as it does with the *manner* in which the materials are used. The kind of materials as well as the style of the store front should always be made to suit the case in hand.

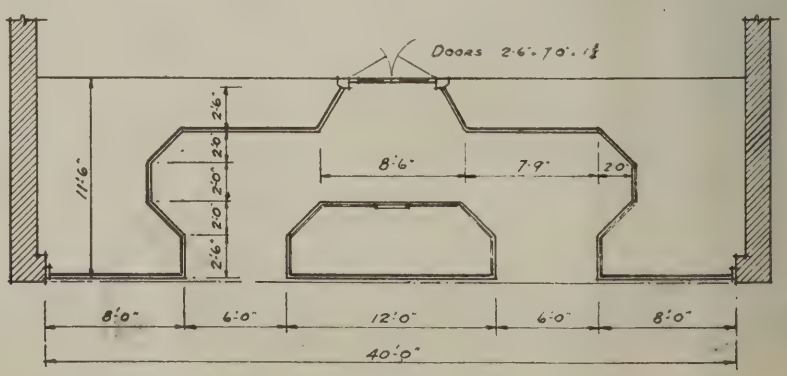
When designing a store front the architect always studies carefully all angles of the problem. He realizes that for the retailer, the store front is an investment and like any other investment it must produce adequate returns. He tries to make it attractive in a dignified manner and of per-

Would you buy meat in a shop that displayed its wares in a window like this?

This picture shows the same shop illustrated at the left after alterations had been completed and a new front installed

Two photographs which should be a good argument for a contractor who is trying to sell a new store front to a merchant





Two plans showing the possible range and recommended dimensions of store front layouts

manent construction. It is up to the builder then to make the store front a credit to the neighborhood and an advertisement for himself as well as for the retailer.

There are four steps in the design and construction of a store front, viz: the design, the selection of the materials of which the front is to be built, bracing the building while the new front is being installed and finally, finishing the job in a good and workmanlike manner.

The selection of the plan depends entirely upon the class of merchandise which is to be displayed. Store-front plans range in design from the simple, center-entrance type with a shallow show window to the so-called arcade or island front, which may be arranged with a single or several large isolated show-cases called islands.

A wide front to attract fast-moving customers from a busy street

A terra-cotta and tile store front designed especially for a shoe store

A brick front with steel frame windows for an automobile display room

The choice of materials of which the front is to be built offers a good opportunity for the display of good taste, and due to the flexibility with which certain materials may be handled, a very attractive front may often be installed for a small amount of money.

Brick with cut-stone or terra cotta trim, terra cotta entirely or wood with copper or sheet metal trim may be used. The amount of money available is generally the controlling factor which decides the choice of materials. The method of holding the store front glass in place may be either wood frames, steel frames, or the various systems of copper-strip construction. These different methods vary considerably in cost, but any may be used to do the work required.

A new store front generally means the removal of intermediate supports and the installation of a single beam to span the width of the building, some temporary support for the upper floors is necessary while the intermediate supports are taken out and the new beam installed. Timber needling or underpinning is generally used and their use will be explained in a succeeding article.

The fourth step, finishing the front in a good and workmanlike manner is entirely dependent upon the man who has charge of the work and no explanation need be offered here to NATIONAL BUILDER readers as to what constitutes a job done in a good and workmanlike manner. This last point, however, is the deciding factor which will determine the builder's success and to the man who glories in a job well done and who delights to point with pride to a real workmanlike job, no form of building work offers as much opportunity for satisfaction as store-front construction.

A midnight photograph of an "island" store front

Helping Contractors Sell Houses in New Orleans

Salmen Brick and Lumber Co. Brings Clients and Contractors Together

IT is a well-known fact that the general public is exceedingly ignorant of construction details, and seldom is a prospective home-builder able to visualize his finished house from the blue prints and sketches before him. This state of affairs is not to be wondered at, since it is unusual to find people not engaged in the building trades who have ever had any considerable construction experience. Even those who have built a home before can hardly be said to possess enough knowledge to be able to judge how the erected detail will look by merely glancing at the blue print.

This lack of knowledge on the part of the building public not only causes many disappointments when the new house does not turn out as was expected, but also causes considerable trouble to the builder who, through no fault of his own, has turned out an unsatisfactory house. It may be that the door-pattern does not appear as it did on the print, or that the kitchen cabinet is not what was expected of the one ordered from the catalog, or else the pine floor does not look as good as the oak floor might have looked, or the closet shelving is not as convenient as the plan showed it to be—any number of these annoying petty details may arise. Though the contractor has built exactly to the architect's plan, and is therefore not to blame, and though the architect has used his best judgment and skill, some little detail may easily go wrong simply because the owner thought it was what he wanted when he saw the blue print.

With a view to serving its customers with the highest degree of efficiency, the Salmen Brick and Lumber Co. of New Orleans, La., has built a display room which ushers in a new era in the field of merchandising building materials. It has made it possible to do away with the annoyances and disappointments due to the inability of the home-builder to see the house from the plans, and at the same time has rendered such service to the contractors who buy their materials that they have managed to increase both their list of customers and their amount of sales, at the same time rendering a genuine service to the home-owners and prospective home-owners of the city of New Orleans.

Contractors are especially invited to make use of these facilities in selling to their clients; and special provisions are made for contractors to confer with prospects.

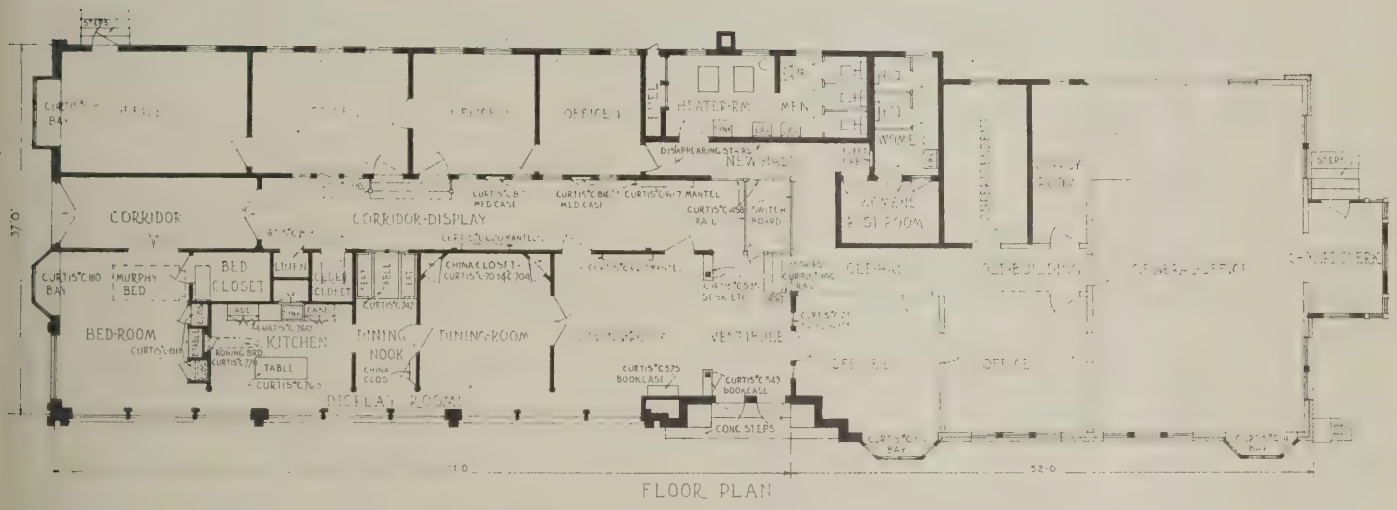
The show-room occupies one-half of a building designed for office and show-room facilities. It consists of a long display corridor from which lead doors to completely furnished rooms. Along the corridor are placed such stock products as kitchen cabinets, mouldings, railings, etc., and each door is of a different pattern, painted or stained in different colors and finishes. The display rooms include a living-room, dining-room, bedroom, kitchen and breakfast nook, all completely furnished and containing many of the modern built-in features such as are coming into general use. The flooring of each room is of a different kind of wood or laid in a different grain of the same wood, and to illustrate various floor effects, different methods of laying the different floors were used. Each room contains a suitable lighting system, showing the proper method of illumination, and all wall color schemes were carefully planned so that they would suggest ideas for decorating and furnishing as well as for building. Plenty of daylight is afforded by the wide plate glass windows which form one wall of each room.

Showrooms and office of the Salmen Brick and Lumber Co., New Orleans. Morgan D. E. Hite, architect. The showrooms are in the fore part of the building where the large windows are located

The prime idea behind the whole project is expressed in the following words by Mr. W. J. Ferguson, who is manager of the *contractors' service department:* "We have aimed to reproduce in our show-rooms a complete small house, utilizing as far as possible all our own products in its construction. We have tried to arrange things so that the contractor could bring his client here and actually show him how the kitchen cabinet, the folding bed, the stairway or the closet arrangement will really appear

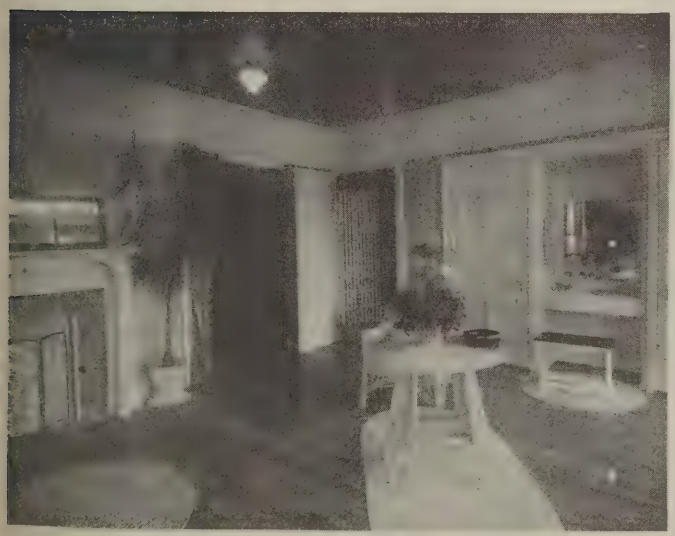
Display corridor in the showrooms. Note the different doors and built-in features

The dining room. All material for building this room was taken directly from stock



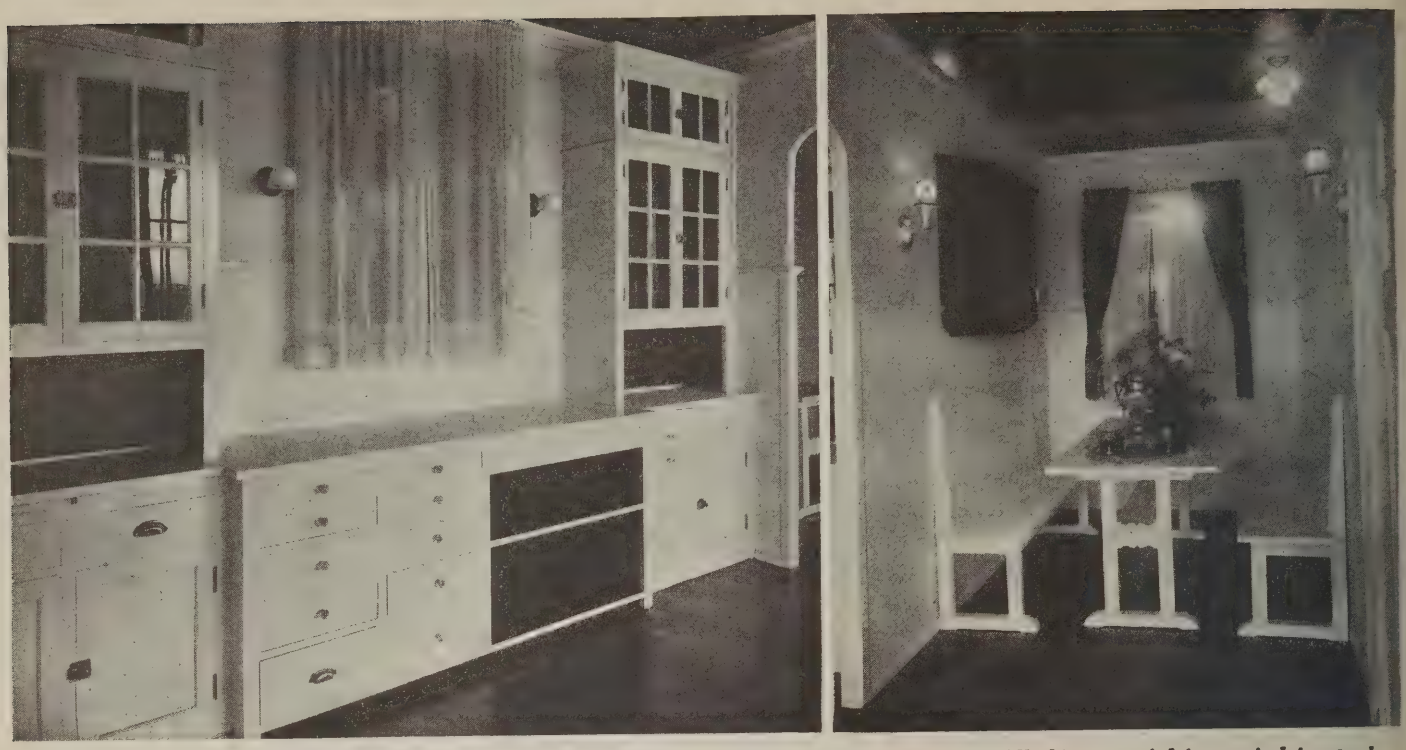
FLOOR PLAN

Floor plan of the showroom and office building. The unshaded portion represents the original building. Note the logical layout of the showrooms and the large windows which admit plenty of light



The bedroom. Note the disappearing bed and the built-in dressing unit. These are both carried in stock

The living room. Even the brick in the fireplace and the tile ornaments are standard stocked material



Kitchen cabinet and breakfast nook in the Salmen Brick and Lumber Co.'s showroom. All this material is carried in stock

when it is installed in his own home."

In addition to their other service, this company operates a building department which helps prospective home builders to select the design for their house and also helps them to get in touch with reliable contractors who are capable of doing the work. This plan department does not design houses, but it will make alterations on certain stock plans which have been drawn by an architect hired by the company or furnished by one of the various plan service companies. The building department does not attempt to furnish plans for large houses, limiting itself to houses of six rooms or under.

The present show-room was designed by Morgan D. E. Hite, a New Orleans architect, and is really an addition to the Salmen Brick and Lumber Company's original office building. Fred Salmen is president of the firm, R. F. Mestyer is manager, and Chas. Eckhardt is assistant manager.

National Slate Association Meeting

AT the meeting of the National Slate Association, held at the Hotel Commodore, New York City, on April 20, 1923, many subjects of interest to the slate industry and to slate users were discussed, among which were: Standardizing different thicknesses and widths, arrangements for quotations to architects, builders and roofers, sales policies, co-operative advertising and credits. The association has 40 active and 13 associate members, and it is expected that all producers will be enrolled in the near future.

Temporary Supporting Bent

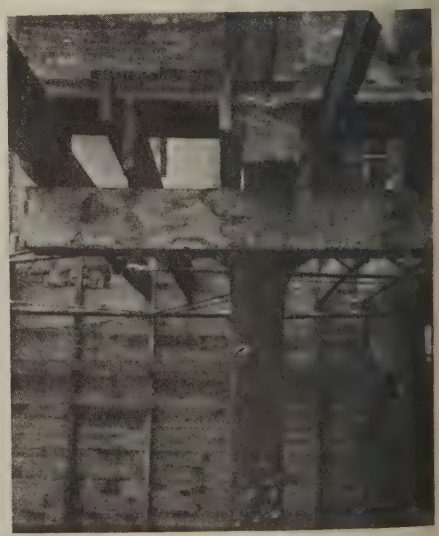
IN remodeling work much money can be saved by wrecking only what is absolutely necessary and saving all of the old structure that is possible. The two photographs below illustrate how the Morriss Construction Co., of Montgomery, Ala., not only saved considerable money but also made their timber underpinning do double duty.

It was required to support a second-story brick wall until the first-story wall could be built under it and it was also necessary to support a floor girder and some joists of the old building which were to be incorporated into the new structure.

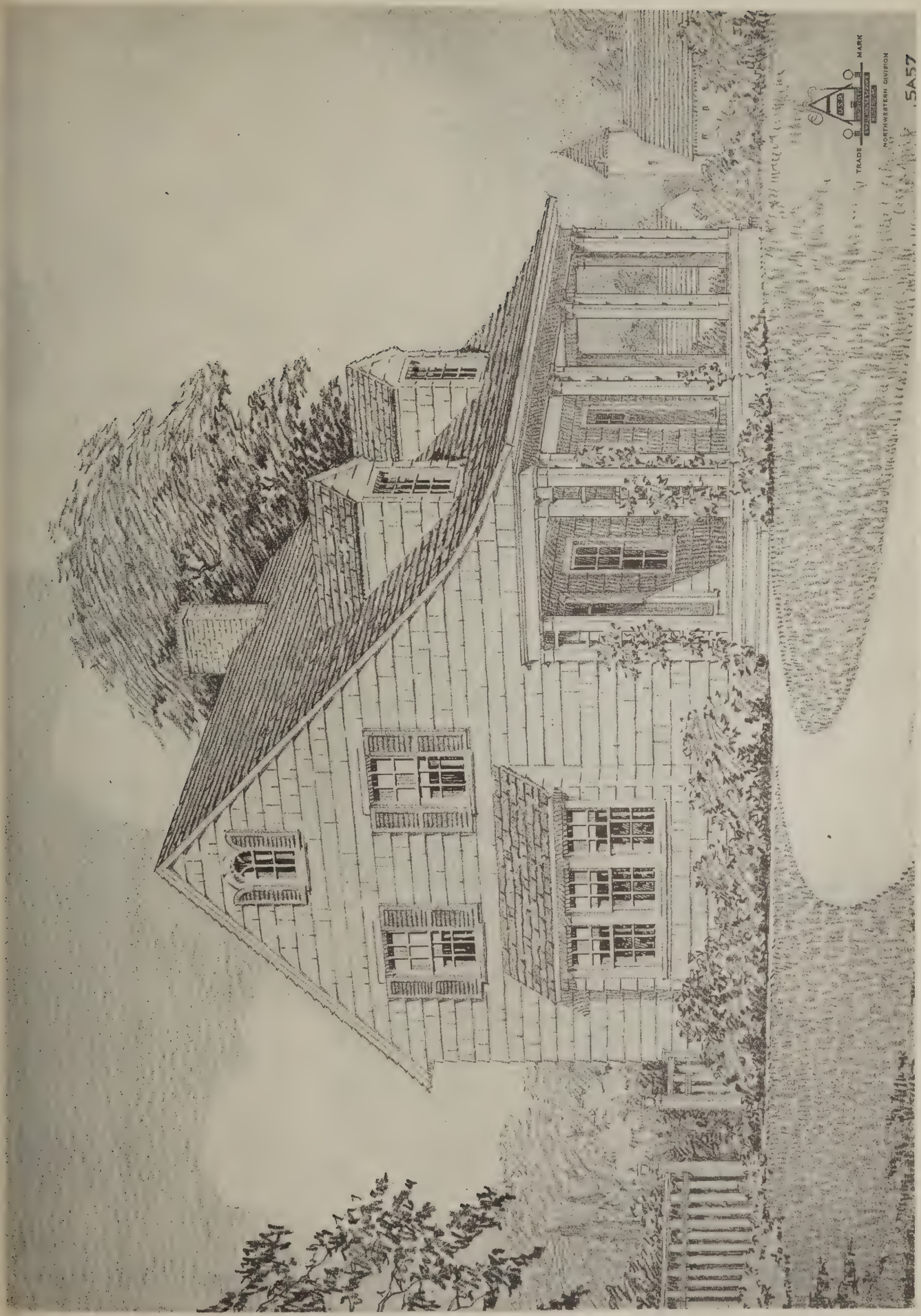
In order to save using a long timber as part of the supporting bent, a heavy timber was used to support the floor girder remaining from the old building, and the timber for the bent was supported on plates which rested on the old floor joists.

To prevent the joists from being crushed by the heavy load a timber block was placed between the timber girder of the old building and the plates which supported the leg of the bent. Wedges were driven between the block and the plate so that most of the load was taken off the light joists. Quite a bit of timber and labor was saved, no damage to the original structure resulted, and plenty of unobstructed working space was afforded by this arrangement.

General view of the job



View showing block in place



Farm House No. 5A57, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.
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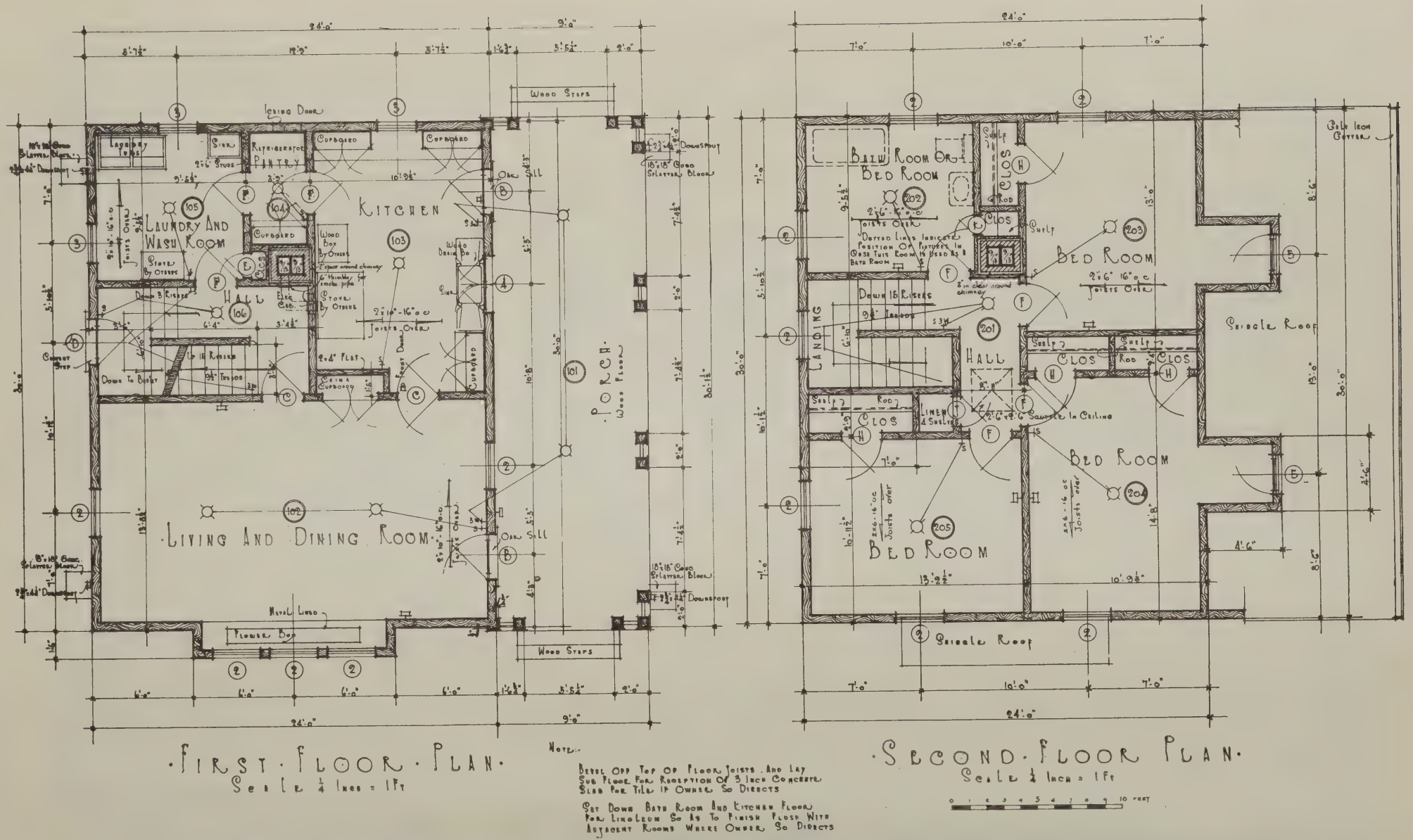


Floor plans of House No. 5A57, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc. Copyrighted by National Builder and The Architects' Small House Service Bureau

Dimensions are taken to outside of foundation walls, to outside of sheathing on exterior walls and center of studs for partitions.

Foundation walls shown concrete may be stone, brick, concrete block, or load-bearing hollow tile.

Where building ordinances permit, foundation walls may be 9 in. thick (with 20x9-in. footings), except in case of stone, which shall be 18 in. thick.

Stock numbers refer to moldings in Universal Millwork Design Book No. 20. In case these moldings cannot be procured, others of similar design and size may be substituted.

Provide 1⅛-in. screen and storm sash for all exterior openings, except ice door, unless otherwise noted. Bottom rail of storm sash to have vent.

Dutch Colonial Farm House No. 5A57

Especially Designed for Comfort and Convenience

THIS is a farm house in Dutch colonial style. The modern farm house has been s scientific a matter of designing as a city ouse. It does not answer the problem at ll to take the most skillfully designed city ouse and place it out on the farm, for the roblem of running a home on the farm a totally different thing from that of the ity. On the farm kitchens must be larger or at certain season meals for a large umber of people must be prepared. Then here must be space to set many people at ables, and it is fine in the summer time if his can be done on an open porch. There must also be a special place for a wash oom for the use of those who come into he house after working in the fields. In ddition to this there must be more storage space for foods than is required in city houses.

Design 5A57 has had worked out in it all of these problems and others that are peculiar to a farm house. There is nothing freakish about it. It makes a beautiful little home that from the standpoint of appearance alone would make any small-home owner glad to have it, but it also has particular qualities which make it especially suitable for a farm.

The broad front porch makes an inviting place to sit in the summer. Entrance is had from this porch either into the kitchen or living room.

The living room, by the way, is to be used for a dining room during harvest periods, or other times when there are many people to feed. The kitchen is large and has commodious closets and cupboard space.

On the first floor there is a combination washroom and laundry. A grade entrance makes this room easy of access from the outside.

In the second story there are three bedrooms, and in case the bathroom should not be finished off, there is a fourth bedroom. Each bedroom is equipped with at least one large closet and has cross ventilation.

The house is of frame construction with exterior finish of wood siding. It is designed to face south or east, and should be reversed for other facings. It is 30 ft. wide and 33 ft. deep including the porch.

The regular price for this plan is $25.50. ($13 to NATIONAL BUILDER subscribers.)

EXCAVATING—170 cu. yd.

BACKFILL—56 cu. yd.

CEMENT FLOOR—5 cu. yd. gravel; 3 cu. yd. nd; 48 sax cement; 4 cement spatter blocks.

FOUNDATION—If 12" concrete, 44 cu. yd. ravel, 178 sax cement; if 9" concrete, 36 cu. yd. ravel, 146 sax cement; if 12" tile, 21200 CBM le, 16 cu. yd. mortar; if 9" tile, 17000 CBM tile, 3 cu. yd. mortar.

CHIMNEY—2030 common brick; 250 face brick; 6 lin. ft. 8x12 flue tile; 2 cu. yd. mortar; 2—x10 cleanout doors; 5 yd. metal lath; 3—6" adustable thimbles.

LATH—9 yd. metal lath over boiler; 10250 ood lath.

PLASTER—9 yd. on metal lath; 732 yd. on ood lath; 30 yd. on concrete; 19 yd. Keene's ement.

TILE FLOOR—90 sq. ft. ceramic tile; 35 lin. . cove base.

LUMBER—4—6x6-7 posts; 1—6x10-14 girder; —6x10-16 girder; 3—6x6-9 girders; 4—4x4-7 osts; 3—2x10-14 stair horses, basement; 78 lin. . 2x4 basement partition plates; 20—2x4-7 basement partition studs; 500 ft. D & M basement artition sheathing; 3—2x6-12 platform landing aming; 16—2x6-16 porch joist; 2—2x6-9 porch oist headers; 24—2x10-24 first floor joist; 4—x10-14 first floor joist doubles; 2—2x10-12 first oor joist doubles; 3—2x10-16 headers; 890 ft. om. bds. first floor subfloor; 1000 ft. 13/16x ½ first floor finish floor; 300 lin. ft. 1x3 idging; 1200 lin. ft. grounds; 340 ft. porch ooring; 340 ft. ⅝x4 ceiling porch; 160 ft. ⅝x4 eiling plancier; 234 lin. ft. 2x4 first floor partiion plates; 70—2x4-9 first floor partition studs; —2x10-14 stair horses; 8—2x10-14 second floor ist; 12—2x10-16 second floor joist; 13—2x10-24 econd floor joist; 2—2x10-12 second floor joist oubles; 2—2x10-14 second floor joist doubles; 50 ft. com. bds. second floor subfloor; 1030 ft. 13/16x1½ second floor finish floor; 354 lin. ft. c4 second floor partition plates; 100—2x4-8 second floor partition studs; 24—2x4-11 porch ceiling ist; 4—2x4-9 second floor ceiling joist; 13—c6-24 second floor ceiling joist; 19—2x6-16 second floor ceiling joist; 2—2x6-14 second floor eiling joist headers; 8—2x4-14 dormer studs and ates; 4—2x10-9 porch girders; 4—2x10-10 porch rders; 2—2x10-12 porch girders; 10—2x4-16 lookits; 60 lin. ft. 1x6 ribbon; 30 lin. ft. 1x8 ridge fter; 3—2x4-16 dormer rafters; 324 lin. ft. 2x4 ttside wall plates; 96—2x4-16 outside wall studs; —2x4-10 gable studs; 48—2x4-20 rafters; 24—c4-12 rafters; 3—2x4-14 bay rafters; 1720 ft. com. bds. roof sheathing; 13½ M shingles for roof; 2200 ft. shiplap wall sheathing; 10 M shingles for O S walls; 1—2x12-14 step horses; 20—2x4-16 scaffold; 8—2x6-16 scaffold; 4—2x10-18 scaffold.

MILLWORK—Frames: 4 single sash 8x10-3L-1¾; 9 single wd. 10x12-12L-1¾; 1 triple wd. 10x12-12L-1⅜; 3 single wd. 8x10-12L-1⅜; 1 mul. casement 8x10-6L-1¾; 2 single casement 8x10-12L-1¾; 2 single casement 10x12-6L-1¾ circle head. **Windows:** 4 cellar sash 8x10-3L-1¾; 12 windows 10x12-12L-1⅜; 3 windows 8x10-12L-1⅜; 2 casements 8x10-6L-1¾; 2 casements 8x10-12L-1¾; 2 casements 10x12-6L-1¾ circle head. **Storm Sash:** 4—8x10-3L-1⅛; 12—10x12-12L-1⅛; 3—8x10-12L-1⅛; 2—8x10-6L-1⅛; 2—8x10-12L-1⅛; 2—10x12-6L-1⅛ circle head. **Screens:** 4—8x10-3L-1⅛; 12—10x12-12L-1⅛; 3—8x10-12L-1⅛; 2—8x10-6L-1⅛; 2—8x10-12L-1⅛; 2—10x12-6L-1⅛ circle head. **Shutters:** 6 pr. (windows) 10x12-12L; 3 pr. 8x10-12L; 2 pr. 10x12-6L circle head. **Outside Door Frames:** 2—2'8x7'0-1¾; 1—2'8x6'8-1¾; 1 icing door frame. **Outside Doors:** 2—2'8x7'0-1¾ (No. 1600); 1—2'8x6'8-1¾ (970); 1 icing door. **Storm Doors:** 2—2'8x7'0-1⅛; 1—2'8x6'8-1⅛. **Screen Doors:** 2—2'8x7'0-1⅛; 1—2'8x6'8-1⅛. **Outside Millwork:** 216 lin. ft. cornice; 50 lin. ft. porch facia; 50 lin. ft. porch soffit; 50 lin. ft. porch base; 4 wood brackets under bay; 8 lattice panels 1'0x8'6; 12 porch posts; 2 half porch posts; 2 set front steps 6'0; 80 lin. ft. porch ceiling cove. **Interior Doors:** 1—2'8x6'6-1⅜ (No. 720); 3—2'6x6'8-1⅜ (1102); 2—2'6x7'0-1⅜ (1102); 1—1'4x7'0-1⅜ (1102); 4—2'6x6'8-1⅜ (1102); 4—2'4x6'8-1⅜ (1102); 1—1'8x6'8-1⅜ (1102); 1—1'2x6'8-1⅜ (1102). **Jambs:** 1—2'8x6'6; 3—2'6x6'8; 2—2'6x7'0; 1—1'4x7'0; 4—2'6x6'8; 4—2'4x6'8; 1—1'8x6'8; 1—1'2x6'8. **Interior Trim:** 4 sides 8x10-3L; 9 sides single 10x12-12L; 1 side triple 10x12-12L; 3 sides single 8x10-12L; 1 side mul. casement 8x10-6L; 2 sides single casement 8x10-12L; 2 sides single casement 10x12-6L circle head; 2 sides door 2'8x7'0; 1 side door 2'8x6'8; 1 side icing door; 2 sides door 2'8x6'6; 6 sides door 2'6x6'8; 4 sides door 2'6x7'0; 2 sides door 1'4x7'0; 8 sides door 2'6x6'8; 8 sides door 2'4x6'8; 2 sides door 1'8x6'8; 2 sides door 1'2x6'8; 1 flight basement stairs with rail; 1 flight grade stairs; 1 flight main stairs with rail; 1 medicine cabinet; 1 scuttle door 2'6x2'6; 1 scuttle door jamb 2'6x2'6; 1 side 2'6x2'6; 4 linen closet shelves; 1—8'0 flower box; 1 china cupboard; 2 wood drainboards; 1—3'6 kitchen cupboard; 2—3'6 kitchen cupboards with work table; 1—3'0 pantry cupboard; 560 lin. ft. base; 560 lin. ft. base shoe; 560 lin. ft. base molding; 266 lin. ft. picture molding; 76 lin. ft. ceiling cove; 24 lin. ft. closet shelving; 24 lin. ft. closet hook strip; 24 lin. ft. closet clothes rod; 9 lin. ft. threshold; 42 lin. ft. band molding. **Note:** If living room trim is changed, it will affect the following items: 1 door 2'8x7'0-1¾ (No. 1600); 1 side trim 2'8x7'0; 2 doors 2'6x7'0-1⅜ (1102); 2 jambs 2'6x7'0; 2 side trim 2'6x7'0; 1 china case; 1—8'0 flower box; 2 sides single trim 10x12-12L; 1 side triple trim 10x12-12L; 66 lin. ft. base; 66 lin. ft. base shoe; 66 lin. ft. base molding; 76 lin. ft. ceiling cove; 76 lin. ft. picture molding; 450 ft. 13/16x1½ finish floor.

INSULATION—3 rolls for floors; 5 rolls for walls; 4 rolls for roof; 1780 ft. ½" insulation for walls; 752 ft. ½" insulation for ceilings.

WEATHER STRIPPING—4 cellar sash 8x10-3L; 12 windows 10x12-12L; 3 windows 8x10-12L; 2 casements 8x10-6L; 2 casements 8x10-12L; 2 casements 10x12-6L circle top; 2 doors 2'8x7'0; 1 door 2'8x6'8.

CAULKING—20 single frames; 1 mullion frame; 1 triple frame; 3 door frames; 1 coal chute.

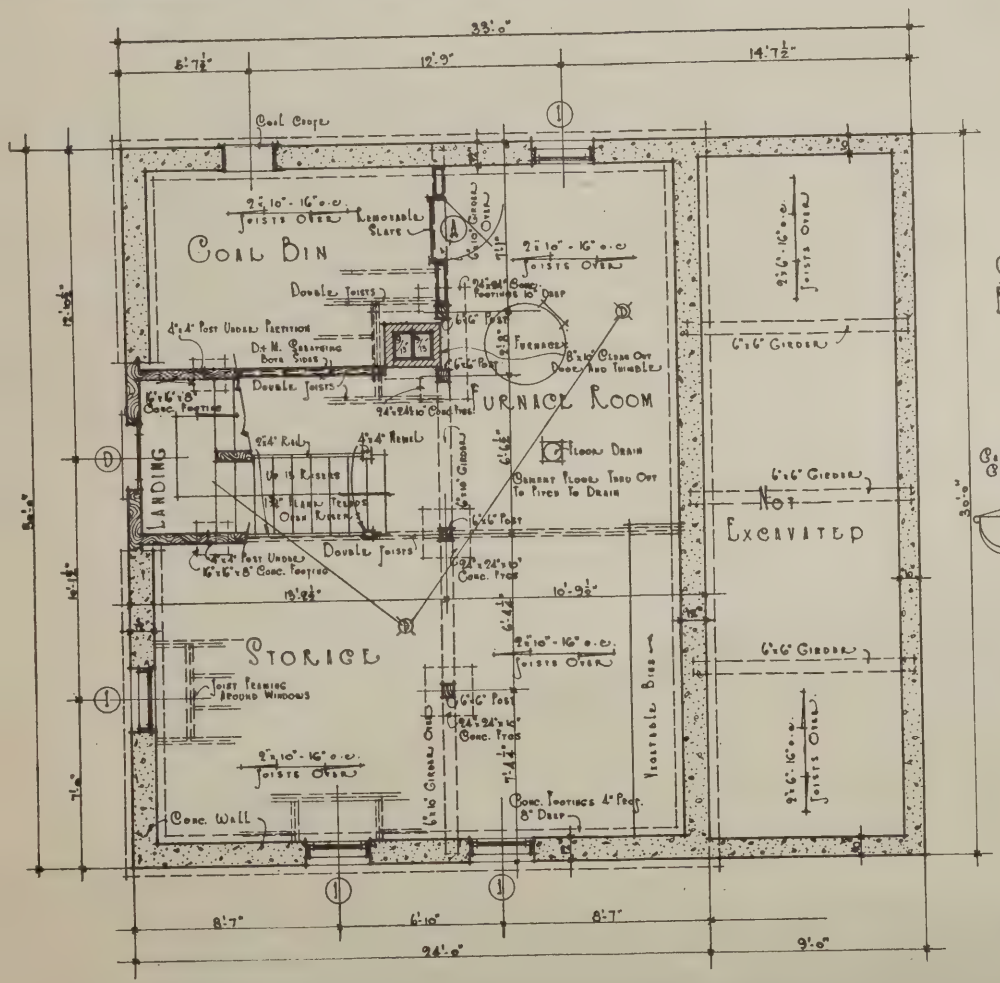
TINWORK—52 lin. ft. gutter; 8 gutter ends; 20 gutter hangers; 4 nipples; 4 elbows; 4 offsets; 4 strainers; 58 lin. ft. conductor; 8 straps; 1—8'0 flower box lining; 56 lin. ft. ridge roll; 6 finials; 10 lin. ft. chimney flashing; 40 lin. ft. valley tin; 250 tin shingles.

HARDWARE—4 cellar sash sets; 15 sash locks; 15 sash lifts; 6 casement sash sets; 25 storm sash sets; 25 screen sets; 11 sets shutter hardware for pairs; 2 front door sets with butts; 1 rear door set with butts; 1 icing door set with butts; 3 storm door sets with butts; 3 screen door sets with butts; 1 floor hinge; 2 push plates; 16 inside door sets with butts; 20 door bumpers; 3 doz. clothes hooks; 4 stair rail brackets; 1000 lb. assorted nails; 5 lb. assorted brads; 450 lb. sash weights; 3 hanks sash cord; 1 coal chute; (medicine cabinet: 1 pr. ornamental butts, 1 cupboard turn, 1 pr. hinges for scuttle door); (kitchen cupboard: 10 pr. ornamental butts, 5 cupboard turns, 5 blind catches, 6 drawer pulls); (pantry cupboard: 4 pr. ornamental butts, 2 cupboard turns, 2 elbow catches, 2 drawer pulls); (kitchen cupboard: 4 pr. ornamental butts, 2 cupboard turns, 2 blind catches, 2 drawer pulls); (china case: 18 drawer pulls, 1 cupboard turn, 1 blind catch, 2 pr. ornamental butts).

EXTERIOR PAINTING—30 gal. shingle stain for walls; 6 gal. trim paint; 3 gal. boiled oil; 40 gal. shingle stain roof; 1 gal. porch floor paint; ½ gal. screen paint; ½ gal. sash color; ½ gal. shellac; 1 gal. japan; 5 lb. putty.

INTERIOR PAINTING—13 gal. white paint; 7 gal. enamel; 5 gal. filler stain; 2½ gal. shellac; 10 gal. interior varnish; 3½ gal. floor shellac; 6 gal. floor varnish; 2 gal. oil; 1 gal. japan; 1 gal. turpentine; 1 gal. alcohol; 3 lb. steel wool; 3 doz. sheets assorted sandpaper.

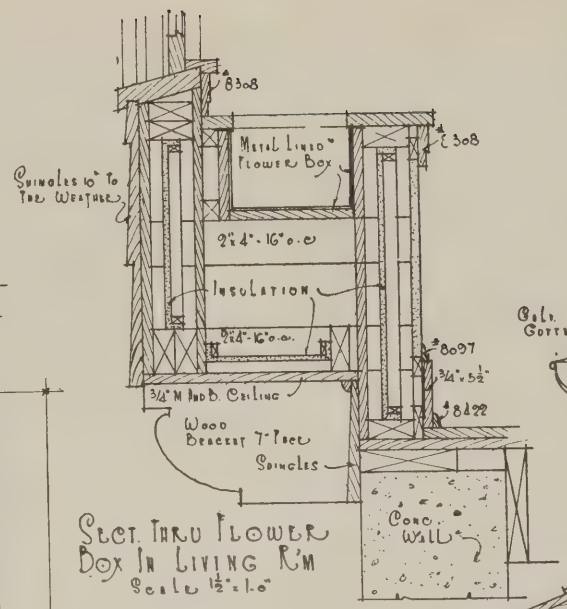
MATERIALS		ELECTRIC WIRING SYMBOLS			
CONCRETE		CEILING OUTLET		3 WAY SWITCH	
BRICK		DROP CORD		GAS OUTLET	
WOOD		BRACKET		PUSH BUTTON	
PLASTER		BASE PLUG		BELL OUTLET	
TILE		SWITCH		BUZZER	



Basement Floor Plan

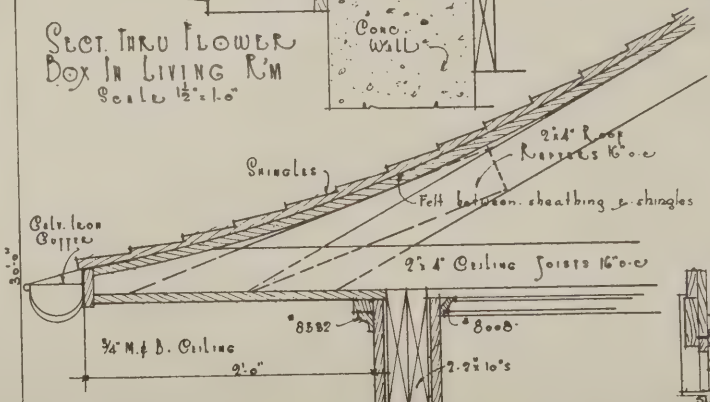
Scale ¼ Inch = 1 Ft.

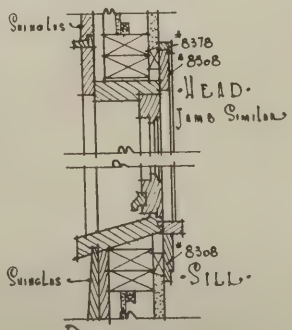
Note:-
Location Of Septic Tank To Be Determined By Owner.



Sect. Thru Flower Box In Living Rm

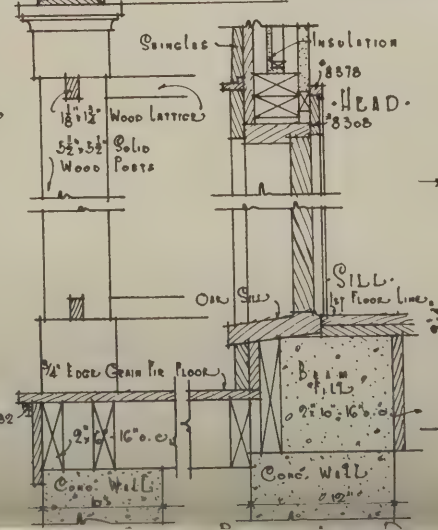
Scale 1½"=1'-0"

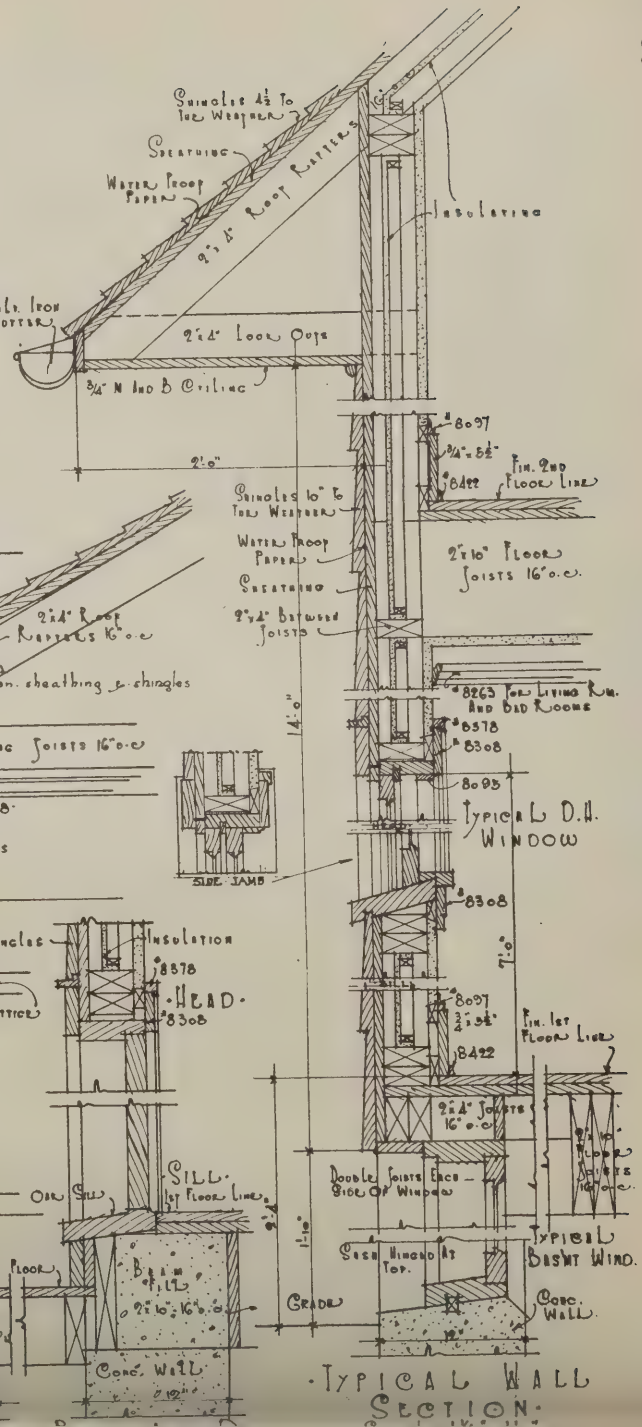




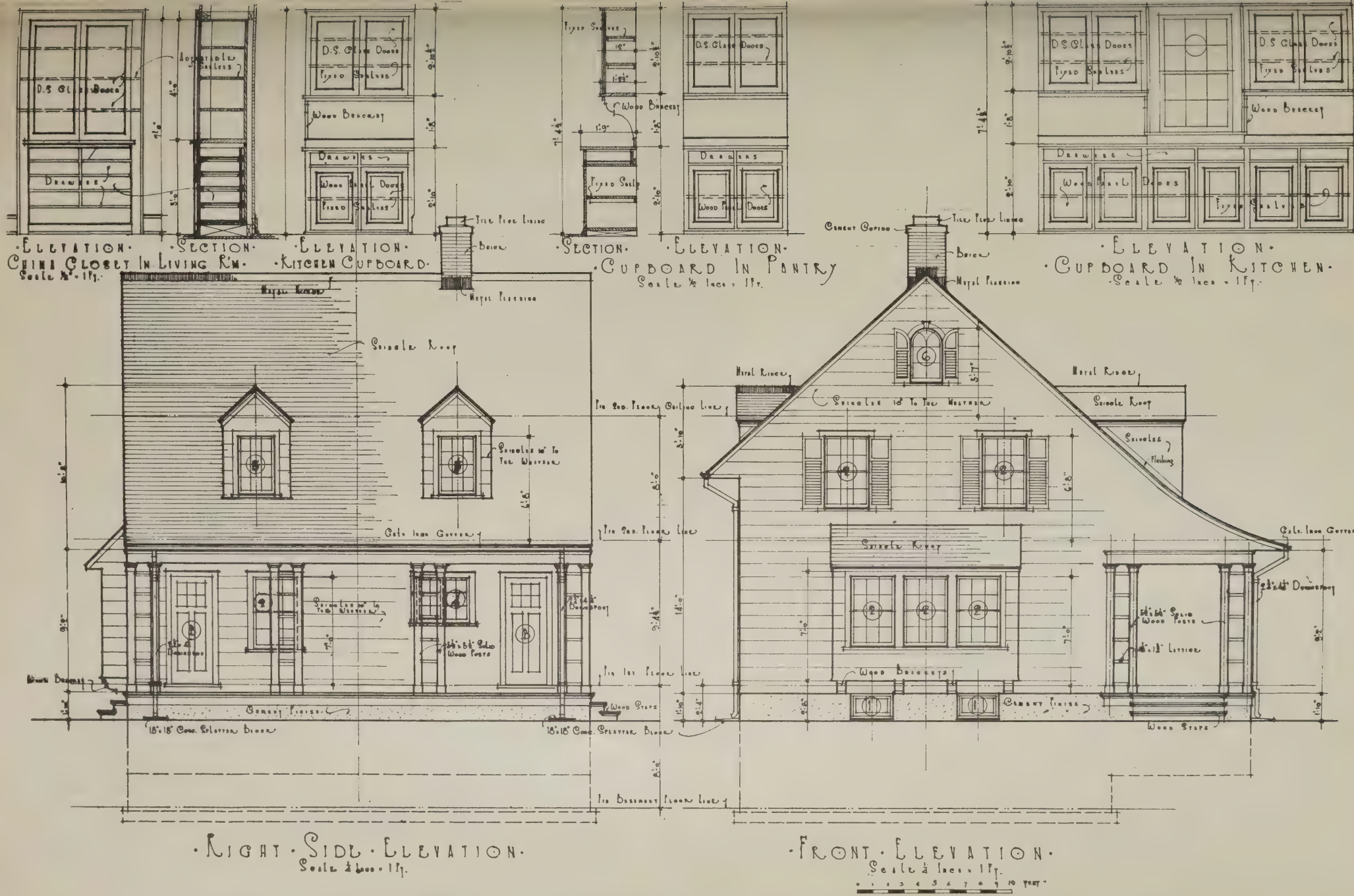
Detail Of Casement Window

Scale 1½"=1'-0"





Typical Wall Section



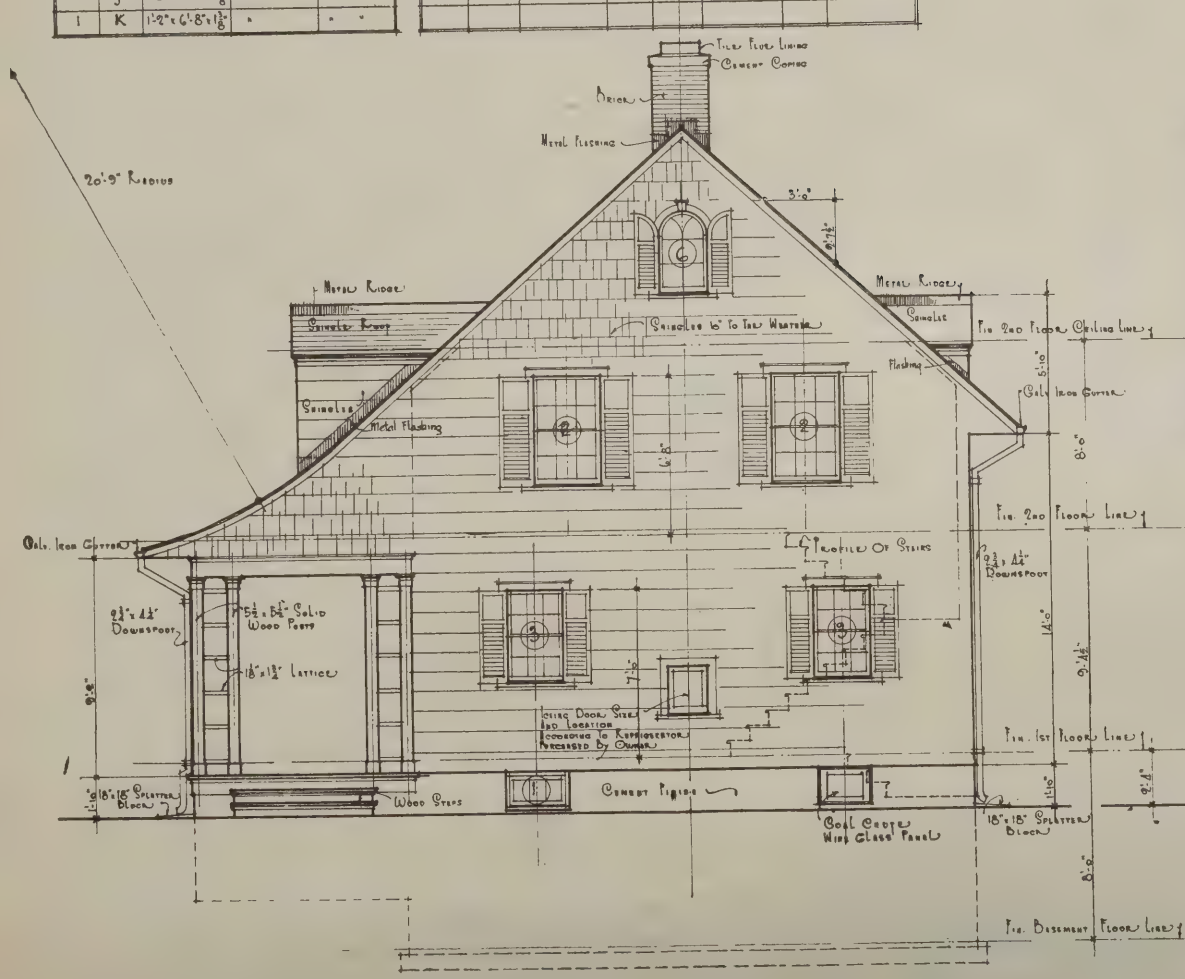
Front and right side elevation of House No. 5A57. Copyrighted by National Builder and The Architects' Small House Service Bureau

Schedule of Doors

Quantity	Type	Size	Description	Remarks
1	A	2'-8"x6'-6"x1 3/8"	# 720	5 x Panels
2	B	2'-8"x7'-0"x1 3/4"	# 1600	Glss R. Gl.
2	C	2'-6"x7'-0"x1 3/8"	# 1102	2 Panels
1	D	2'-8"x6'-8"x1 3/4"	# 970	11 Lt D.S. Gl.
1	E	1'-4"x6'-8"x1 3/8"	# 1102	2 Panels
7	F	2'-6"x6'-8"x1 3/8"	"	" "
4	H	2'-4"x6'-8"x1 3/8"	"	" "
1	J	1'-8"x6'-8"x1 3/8"	"	" "
1	K	1'-2"x6'-8"x1 3/8"	"	" "

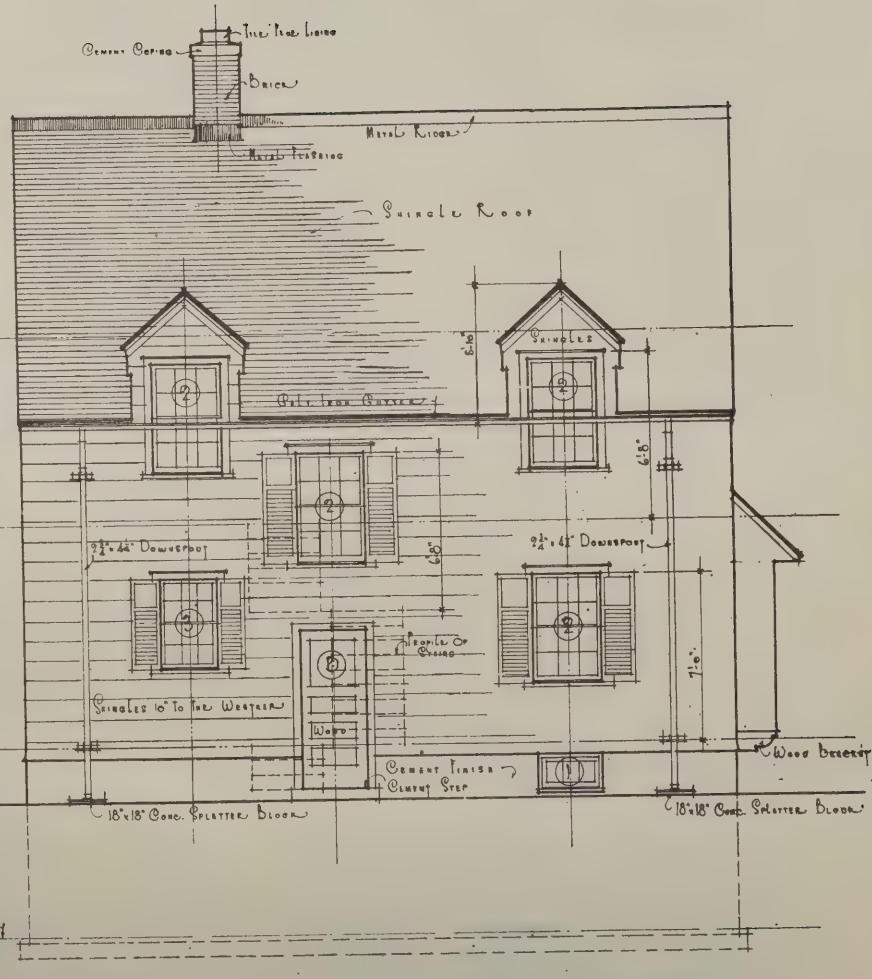
Schedule of Windows

Quantity	Type	Description	No Lights	Size of Glass	Size of Opng for Glass	Thickness of Sash	Frame
4	1	Hinged Sash	3	8"x10"	2'-4"x 1'-3"	1 3/4"	See Detail
12	2	D'bl Hung	12	10"x12"	2'-10 1/2" x 4'-6"	1 3/8"	" "
3	3	" "	12	8"x10"	2'-4 1/2"x 3'-10"	"	" "
2	4	Casement	6	8"x10"		1 3/4"	" "
2	5	" "	12	8"x10"	2'-4 1/2" x 3'-9"	"	" "
2	6	" "	6	10"x12"		"	" "



Rear Elevation

Scale 1/4 Inch = 1 Ft.



Left Side Elevation

Scale 1/4 Inch = 1 Ft.

0 1 2 3 4 5 6 7 8 9 10 Feet

Architectural Exhibitions Increase Knowledge of Better Design

EVERY year various architectural clubs and societies and chapters of the American Institute of Architects in the larger cities unite in presenting to the general public a display of the best examples of recent architecture as a whole and as found in the locality of each exhibition in particular. The illustrations herewith are from the Chicago Architectural Exhibition of 1923, held during May in the galleries of the Art Institute, Chicago, Ill. Clare C. Hosmer, architect, and member of the American Institute of Architects, was the director in charge. The exhibition presents examples of residential, public and commercial, and educational and ecclesiastical buildings, and in addition a fine display of the arts and crafts, as for example, wrought iron work, wall hangings, mosaic tile, etc. Representative displays of the first two groups, residential and public and commercial buildings, are illustrated. These exhibits are commemorated each year by the publication in book form of typical examples and the most striking entries on display.

Hardware Mutual Insurance Building, Stevens Point, Wis. Childs & Smith, Architects

While only a very small percentage of the people of the country can, for obvious reasons, attend these exhibitions, nevertheless their influence is wide. They stimulate interest among architects and builders in the production of buildings of better design, and they help the general public to understand better and to appreciate more and more the "plus value" of the building that is beautiful in proportions and design as well as strongly constructed of sound materials.

Model of farm house near Crown Point, Ind., for Will J. Davis, Jr. Russell S. Walcott, Architect, Chicago

Many Home Improvements in Southern States

STEADY increase in the number of household conveniences and changes which make for greater comfort in the home is noted in the Southern states as a result of extension work. Reports received by the United States Department of Agriculture show that during 1922, 1435 water systems, 1932 lighting systems, 482 heating plants, and 679 septic tanks were installed in these states through the influence of extension workers, who also induced 12,898 householders to screen their entire homes, and 8342 more to screen their kitchens. Screening has been constantly urged by extension workers as a vitally important protection to health. Housewives generally seemed enthusiastic about making their kitchens more convenient, installing labor-saving devices, finishing floors so they would be easier to keep clean, reducing washing, ironing, and other labor by better equipment, and improving the appearance of various parts of the house.

The reports show improvement of 5346 kitchen floors and 6690 other floors; rearrangement of equipment in 9130 kitchens; 1387 sleeping porches built; 7645 club girls' rooms improved and 4730 living rooms done over; 2498 fireless cookers made or bought; 2035 kitchen cabinets installed; 4597 wood boxes made or placed more conveniently; 419 wheel trays, 1417 sinks and drain boards, 1257 washing machines, 282 ironers, 3636 ironing boards, and 1330 other pieces of laundry equipment added. Flower boxes were set up and filled by 16,164 home makers, a striking illustration of the inherent love of beauty in every heart.

Washington Model Home

A MODERNIZED adaptation of the birthplace of John Howard Payne, writer of the immortal song, "Home Sweet Home," is nearing completion in the shadow of the White House at Washington. President Harding will officially open the "model" house on June 4 as a national demonstration for the 1923 Better Homes in America campaign, of which Vice-President Coolidge is chairman.

Following Better Homes Week—June 4 to 10—the house will be moved intact to a permanent site as the property of the General Federation of Women's Clubs, a gift from the Home Owners' Service Institute of New York, which organization secured the fund for its construction with the cooperation of various associations and manufacturers in the building materials field. Thus this "model" demonstration house, made possible by subscriptions of materials and labor from all over the country, will remain at the national capital as a typical example of good architecture and better home planning for the average American family of moderate means.

Secretary Hoover, chairman of the National Advisory Council, Better Homes in America campaign, broke ground for the house on April 23. On May 27 the house was completed, on temporary footings, lacking only the basement.

Donn Barber, Fellow of the American Institute of Architects, designer of the Hall of Fame and the Yale Bowl, replanned the John Howard Payne home, which was built in 1660 at Easthamstead, Long Island, N. Y., and is still standing. The exterior lines of its New England Colonial architecture have been preserved, as have the floor dimensions of the original. Only its physical characteristics and room arrangement have been altered.

The "model" demonstration house was built to conform with the suggestions of the new Department of Commerce suggested Dwelling House Code, which Secretary Hoover was instrumental in forming. Built of concrete block and portland cement white stucco, it is in every sense of the word a fire-resisting house, modernized in every respect.

There are seven primary rooms, as there were in the original Payne home of his New England whaler ancestors. Considerable rearranging of rooms was necessary to meet the needs in the American home of today. Nearly one-fifth of the ground floor area of Payne's birthplace was taken up by a huge central mass of brick masonry forming three fireplaces, a big oven and the necessary flues. Even the relatively modern coal stove was unknown to the Colonist and each room had to be heated by its own fireplace. The central stack has been retained, with fireplace in the living room and flue for the gas stove in the kitchen.

Two small bedrooms which were placed in the first floor of the old Payne home were shifted to the second floor. The space they formerly occupied was used to enlarge the living room, and provide a modern breakfast nook, as the floor plans indicate. The kitchen, also, was considerably modified by Mr. Barber. The original kitchen, 20 feet long and 13 feet wide, would impose considerable hardship on the average housewife today. It was doubtless a necessity in the early days because the more formal dining room was not heated directly and the parlor only opened on "state occasions," and the more comfortable kitchen of the Colonist family was used for all except special gatherings, as living room, dining room and kitchen.

Every modern device for saving steps and lessening the labor in the kitchen is provided in the modernized Payne house at Washington—built-in ironing board, dressers, enameled sink, gas stove, enameled table,

Model home built in Washington, D. C., for 1923 Better Homes in America campaign. Designed and planned by Donn Barber, F. A. I. A., after the original home of John Howard Payne, author of "Home Sweet Home"

resilient cork tile floor, ice box that can be iced from the service porch, broom closet, and nearby convenient breakfast nook.

Brass piping throughout, tiled bathrooms, modern plumbing, built-in china bathroom accessories, cedar lined closets, 100 per cent lighting and convenience outlets for the electric system, hardwood floors of oak, maple, birch and beach, and modern wall finishes of paint, wallpaper and "Sanitas" include some of the features that should be in every well-built modern American home.

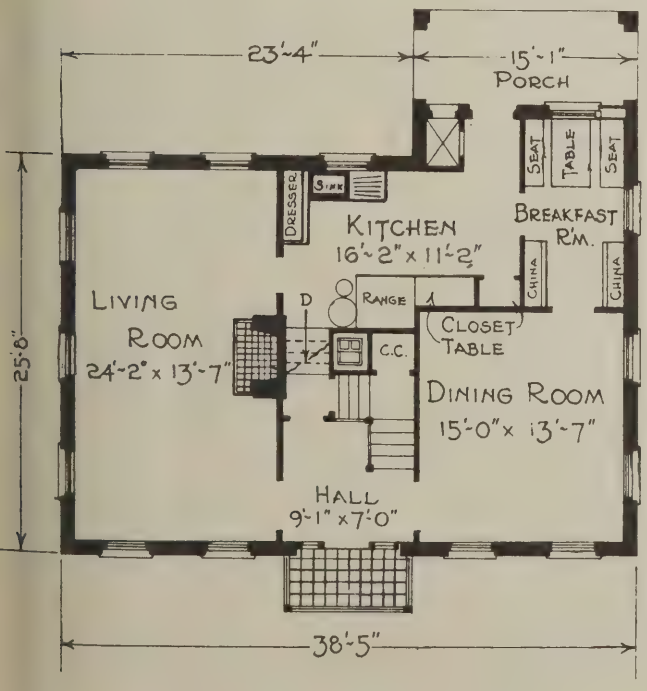
Slate roof, copper metal work, white pine trim, and brick faced concrete porches complete a house built for permanency, at moderate cost, to reduce maintenance and upkeep later. Metal lath throughout, with gypsum plaster and wallboard in one room, provide plaster crack prevention and fire-resistive qualities within. Masonry walls of concrete block make the "model" house practically fireproof.

When moved to its permanent site, the General Federation of Women's Clubs, with which are affiliated 1,800,000 American women club members, and the Department of Agriculture, will conduct various experiments along household economic lines, using the house for this purpose. Following is a list of those associations and manufacturers that made up the fund necessary to construct in record time this national demonstration for Better Homes Week at Washington:

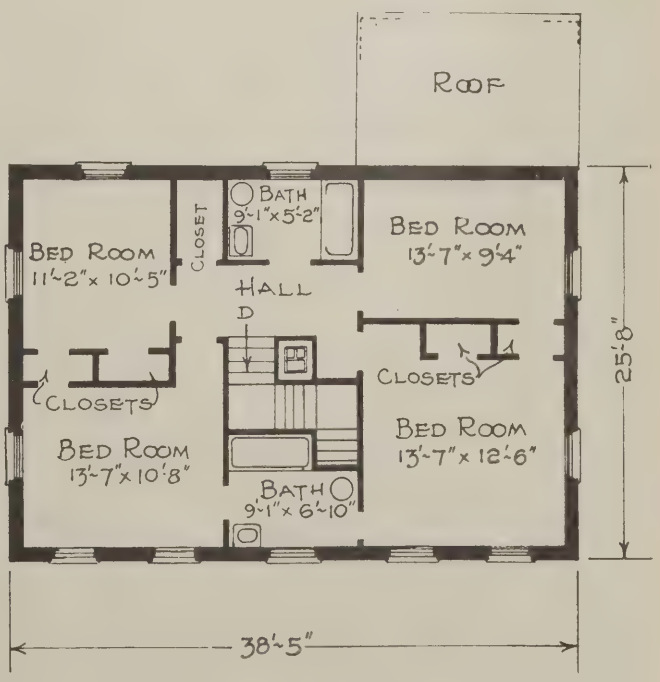
Associated Metal Lath Manufacturers, Copper and Brass Research Assn., Crane Co., American Face Brick Manufacturers, Curtis Companies, Fairfacts Fixture Co., Portland Cement Assn., Yale & Towne Manufacturing Co., Murphy Varnish Co., Standard Textile Products Co., W. M. Ritter Flooring Corp., Common Brick Industry of America, Beaver Tile Co., Kilmoth Cedar Products Co., Wallpaper Manufacturers' Assn., Atlas Portland Cement Co., National Lead Co., Maple Flooring Manufacturers Assn., Fish Brick Co., General Electric Co., National Slate Assn., American Radiator Co., Oak Flooring Bureau, U. S. Gypsum Co., American Gas Assn., Vendor Slate Co., Hunter Fixture Co., Society for Electrical Development, The Gypsum Industries, Home Owners' Service Institute.

Starting construction of the temporary foundation on a site near the White House

Secretary Herbert Hoover breaking ground for Washington model home



First floor plan



Second floor plan

Paint as an Aid to Renting and Selling

4. The Treatment of Floors

By Albert Brace

IN considering the treatment of floors, three factors enter in: (1) The composition of the floor; (2) the style of the house, (3) the character of the room. While there is, of course, a certain consideration of the decorative aspect, nevertheless the prime function of a floor finish is to protect and preserve. To accomplish this most effectively, there is varnish, next floor paint (which contains varnish), then wax and finally oil.

The woods most commonly used for modern residential flooring are oak, chestnut, ash, maple, birch, pine and cypress. The first three are open grained and therefore require filling, while the remainder are close grained and hence require no filling. The two most expensive are oak and maple, which are also the toughest and most durable; the former has considerable figure of its own and is occasionally colored to harmonize with other trim, whereas maple has practically no natural figure and is rarely colored.

No matter what the nature of the wood, however, there are certain points in floor finishing it will be well to heed from the start. In the first place, it will save much time and labor if the floors are finished as quickly as possible after they are laid; if there is to be any delay, the surface should be kept carefully covered with heavy paper. This prevents possible spotting, soiling and denting which will be tedious and expensive to remove as a preliminary to finishing later on.

In the second place it is desirable to have clearly in mind the sort of punishment a floor will necessarily have to undergo from the moment human beings begin to occupy the house. Scuffing feet, rolling furniture, merciless scrubbings with hot water and strong washing powders often constitute a vigorous test for even the most carefully made protective finish. The time to think of this is when the floors are new, for while people can live amidst re-papering, re-kalsomining and the enamelling or varnishing of woodwork, to be denied the privilege of walking over floors is something that keeps many a threshold from receiving the attention it should have when a few licks in time would keep it from being worn into a hollow.

Hardwood Floors

Almost all hardwood floors are finished natural; that is, the inherent amber tinge of the varnish alone supplies color. If the wood is open grained, after being washed clean, sanded to smoothness and dusted, the open pores are leveled up uniform with a colorless filler. This is purchased in paste form, reduced with benzine to a creamy consistency, brushed on in a line with the grain and when it is set hard enough, wiped off with burlap or sea-moss across the grain, leaving none deposited on the surface. Failure to conduct the filling operation carefully or the use of a cheap paste or liquid filler that shrinks in the pores will cause the subsequent varnish coats to fall in at these points and show tiny alternate ridges and pits. Under the influence of foot friction the wearing away becomes far more rapid than where a smooth glass-like surface is presented.

If for any reason it is desired to color the flooring, as for instance an antique to match antique woodwork, it may be done on open grained work by using a filler tinted to the requisite shade. In brushing it on, not only are the pores filled, but the intervening level spaces are colored at the same time. If the wood is close grained it will be necessary to stain, an asphaltum ready mixed oil stain usually being satisfactory for the purpose. Occasionally open grained floors are stained as well as filled, a particular effect being desired not possible through coloring the filler alone. In this case the straining should be done first and the filling next.

Once the filling operation is completed on open grained flooring, the next step is to sand off the work smooth, permitting the filler to show only in the pores and nowhere on the top surface. It is then in the condition of a close grained wood just cleaned, sanded and dusted; *i. e.,* it is ready for the protective finish. This may be either a coat of shellac and two coats of varnish, or two coats of shellac and two coats of varnish, or two coats of varnish direct, a coat of shellac and one of wax, a single coat of varnish and wax or even two or more coats of wax without undercoating. Each method has its partisans, but when it comes to durability, which is the chief test of a floor finish, it is difficult to deny the claims of two or three coats of good floor varnish with or without shellac underneath and wax on top.

Shellac in itself is no protection. It turns white under water, it is brittle and even under varnish may crack if heavily pounded and cause the entire finish at that point to chip off. It has no body as compared to varnish, and when waxed over the wax will wear away at thresholds and rug edges, leaving it exposed to a wear it cannot resist. Similarly wax is not durable in itself, being intended secondarily for protection and primarily for the soft mellow lustre it gives as against a possibly too glossy varnish finish. Wax is easy to keep clean and "waxed floors" are popular on this ground as well, but from the point of view of maintenance, it must be remembered the wax cannot be varnished over—it can only be waxed over so that its deterioration should never be allowed to proceed to a point where the supporting shellac or varnish is in direct contact with heels.

Something is due a handsome job of hardwood floor laying—the carpenter has done his work and if the painter does not do his share he sets at naught much of the effort of his fellow craftsman. There is no excuse for using a poor grade of floor varnish in order to save a few dollars on a job running into thousands, whether the responsibility rests with the painter, the contractor, the architect or the builder himself. A good brand of floor varnish is worth every cent asked for it—the cost of the gums, the scientific care in cooking and blending demands it. Yet cheap varnishes are always at hand to tempt (and to betray) the individual who must and will find a bargain.

In fairness to any brand of varnish it should be used throughout on any given job. That is, if two coat work is called for, it would be a mistake to use the remnant of one can for a first coat and a fresh gallon of another brand over it. If the second varnish should happen to be quicker drying than the first one, there is danger of cracking or crazing later on. This is due to the difference in expansion and contraction caused by changes of temperature—one product is trying to go one way; the other, due to its different composition, cannot follow rapidly enough, much as described under "alligatoring" in the April article dealing with exterior paint work.

Softwood Floors

Hitherto we have considered the better class of flooring, i. e., hardwood, but for cheaper residential construction it is often necessary in order to stay within a price to use a soft wood such as yellow pine. This wood has a coarse figure, lacks the uniform coloring of oak, birch or maple and is full of a resinous pitch which offers a poor anchorage to paint or varnish. On the other hand the sappy parts not only do not hold out the finish, but drink it in greedily. When varnishing to a natural finish, it is well to use two coats, touching up all sappy places first with shellac and bearing in mind that in time the wood will darken considerably in a perfectly natural way.

Another characteristic of soft wood floors

that in drying, large cracks appear which ust be filled in order to offer a tight, nooth surface. The wood filler used for e tiny pores of open-grained woods is, course, entirely insufficient—something arser and harder drying is necessary. here are various patented preparations on e market such as Plastic Surfacer which e very cheap and exceedingly effective. A mber of home-made preparations are also tisfactory and are usually combinations of aster of paris or paste, white lead and var-sh, or glue, whiting and water made up to a stiff putty. These are worked into e cracks with a knife—where the wood is ry dry it will help to drench the edges st with oil or water according to the na-re of the putty and so avoid shrinking. Although it occurred more often in years ne by than now, it is still occasionally the actice to give to unbeautiful soft wood oring the appearance of hard woods rough the process of graining. To accom-ish this, it is not necessary that the floor-g take the form of strips as with oak and aple—the effect of width can be stimu-ted through the graining itself. The wood ed only be rendered as smooth as possible sanding and puttying, then given a coat two of what is known as "ground color," opaque yellowish brown paint that should made to hide thoroughly. It may be ixed from white lead, raw sienna, turpen-ne and oil, but ready-made ground colors ound and their purchase will save time.

The surface is now a uniform buff color d when dry, ready for the graining color, hich is also obtainable in manufactured rm or capable of being made on the job ith distemper colors mixed to brushing nsistency with vinegar. The liquid grain-g color "sets" very quickly and is there-re applied over the ground color in patches out a yard square, the graining taking ace with a tool designed to give the figure genuine hardwood when rolled or drawn er the wet liquid. Much simpler, if less teresting, is straight graining, which is ne with a comb, or a coarse brush, and oduces straight or slightly waved lines as ainst quarter-sawed flakes.

Graining, however, even in its most modi-ed forms is not an amateur's task and illed grainers no longer abound as they ce did; even the old timers have been awn largely into the metal furniture fac-ries and Pullman car shops. The brush d comb graining therefore must and will tisfy most demands for residential work d for all practical purposes are entirely tisfactory. But it is a question whether ere is any real economy in the graining eration, for it is in the last analysis ex-nse of labor versus expense of hardwood. s both of these vary with times and locali-s, the choice is best left to the builder no can balance them for the project.

To finish up the process, once the graining s taken place, the work is allowed to nd for a few hours and one or more ats of varnish are then applied as for ordinary work. If a color darker than a natural is desired, as, for instance, golden oak or dark oak, the varnish can be tinted with umber or sienna or purchased ready made as a varnish stain under those names. Good products of this kind abound on the market, chiefly intended for consumers for touching up woodwork, floors, furniture, etc.

Other Types of Floor Finish

While there are a number of novelty effects produced through the use of paint, the general run of floors so treated are soft wood and confined to servants' rooms in medium class residence construction and kitchens and bedrooms in lower class work. At one time there was a vogue for black or gray floors to go with vivid rugs, draperies and upholstery, and painted floors still are appropriate to Colonial reproductions sometimes even in white. In such cases the boards are long, wide and quite thick.

A floor paint in composition is usually a mixture of white lead, zinc, color, turpentine and linseed oil to which is added a quantity of good hard drying waterproof floor varnish. It may be mixed on the job or secured put up for use from a manufacturer; in either case, there is a glossy effect and the most favored colors are light and medium shades of brown, gray and drab or "dust color." There are occasional calls for green, chocolate brown and maroon. From two to three coats are preferable, the flooring being prepared very much as it would be for a natural varnish finish, i. e., sanded smooth and puttied where necessary. Floor enamel is a heavier bodied form of floor paint and gives a richer effect.

Parquetry floors have rather gone out of style except in hotels, clubs, etc., and are usualy varnished natural and waxed. An oil finish is much favored for maple and birch floors, more, however, in office buildings, schools and factories than in residences. For floors of wide planks in reproductions of New England homesteads, oiling is frequently practiced. The wood is usually oak and laid in uneven widths, the thickness averaging from an inch and an eighth to a half, and the edges at the joints being rounded to give the effect of long use.

These replicas are, of course, far from inexpensive and in their most natural form are not entirely smooth. A marine effect is sometimes added by pouring roofing tar into the wide seams and leveling off, or the more conventional idea may be carried out with one of the crack fillers previously described colored black. While there are many excellent floor oils put up by manufacturers, it is possible to make a very satisfactory substitute in a simple way by adding a little turpentine and paraffin to heated boiled linseed oil. The mixture is then brushed on while still hot and any surplus wiped up; the effect on the wood is to darken it, and it is not advisable to use it on any but hardwoods. The oil finish must be renewed at rather frequent intervals, as scrubbing and foot wear destroy its life.

The use of linoleum has long been popular in kitchens; also through educational publicity campaigns on the part of manufacturers its use is here and there spreading in residential construction to vestibules, hallways, enclosed porches and even halls and dining rooms, there being appropriate patterns for all. This linoleum will last a long time, but with a coat of varnish protection will last even longer, giving the fabric much the same protection as afforded the fibres of wood. A linoleum varnish should be paler than an ordinary floor varnish in order not to alter the color of patterns intermixed with white. An extra coat near the sink, the stove and at the thresholds will insure extra long wear.

While cement floors in residential construction are not common, it may be well to mention them at least in passing, owing to certain peculiar features they present. In the first place, the cement should be allowed to stand in its natural state for at least a few months; following this the floor should be given a dry scrubbing and all loose particles swept up and removed. Apply then a reduced coat of special "cement paint," followed by a second coat over this full strength. Finish off with a coat of good clear floor varnish. This assumes that a color is desired, Bedford stone, "light gray," etc., but if a natural effect will suffice, two coats of "clear cement varnish" will keep the cement in good shape for a long time. Plain unprotected cement will in time wear down and being porous, not only spots readily, but is difficult to clean. By giving a smooth waterproof finish, it is possible to keep such a floor always sightly. Tile, whether glazed or dull, requires no paint or varnish treatn.ent.

A Word About Varnish

Before closing, it may be well to indicate a few of the tests whereby a good floor varnish may be known other than by the price charged for it. Applied to a piece of glass, it should be a very light amber color; it should flow out smoothly on a piece of wood, dry to handle in not less than 18 hours or more than 24, and show a hard glossy brilliance. When hammered it should dent with the wood but not crack; when scratched with a pin, the line should not be powdery and white; when drenched with hot or cold water, it should not lose gloss or show white at the edges.

Varnish, like almost any commodity, may be purchased "at a price." The reward of buying an article of doubtful merit is to see the floor, the foundation of the room become, in a short time, spotted and worn, dirt ground into the wood fibres at the thresholds and the charm of fine woodwork, wall coverings, furniture and fixtures discounted by half. In effect the difference between a good and a poor floor varnish is the difference between a well dressed man whose shoes are polished and the same man with rundown, shabby footwear.

Questions, Answers, Kinks and Discussions

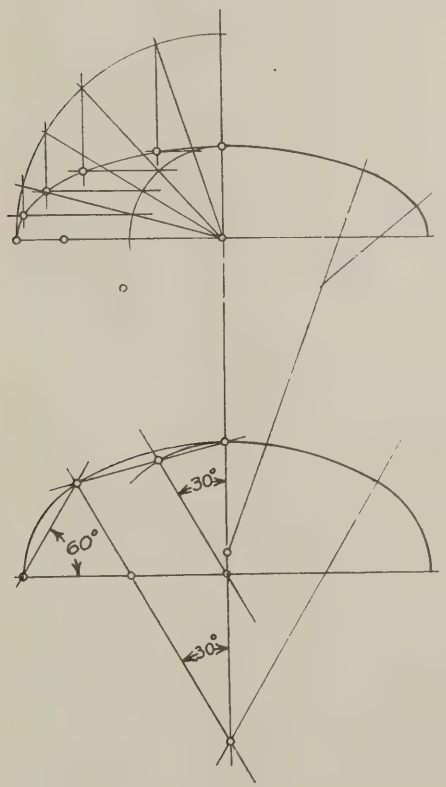
Edited by V. L. Sherman

Herein is a Department of Mutual Help for the Exchange of Experiences and Ideas. It is Not Only Well Worth Your While to Give Your Experiences for What You Get Back from Others, but National Builder Pays You $5 Each for Every Good Kink

Ellipse Vs. Elliptic

THE editor of this department implores the help of any reader who can set him right on this matter. "I have noticed that some of the cuts you have in your paper look very much like the elliptic head, but not the ellipse head." What is the difference?

An ellipse is made by cutting a right cylinder having a circle base with a plane lying at an acute angle with the axis of the cylinder. There are two general methods of drawing an ellipse when the long and short diameters are known. Fig. 1 shows a method which will give the exact curvature. This holds good no matter what the ratio is between the two diameters. If the ratio is not greater than 3 to 2, then three centers will suffice for one-half the ellipse. Fig. 2 shows an approximate method that can be safely used when the ratio between the two diameters is greater than 3 to 2. Through the center *O* a line is drawn at 30 deg. with the short diameter. An arc is struck from *O* with a radius equal to the short radius. From the upper end of the short radius a line is drawn through the intersection of the arc and the 30 deg. line. From the end of the long radius a line is drawn in at 60 deg. with the long radius. From the intersection of these last two lines a line is dropped at 30 deg. with the short radius. The intersections of this line with the long and short diameters furnish the centers from which the ellipse arcs are struck.



Figs. 1 and 2—Drawing an ellipse

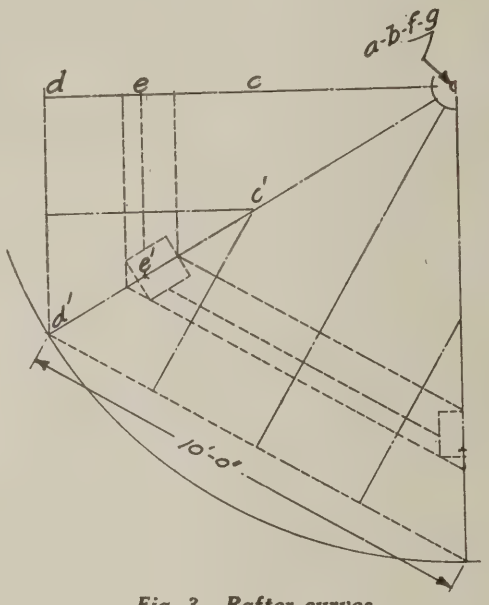
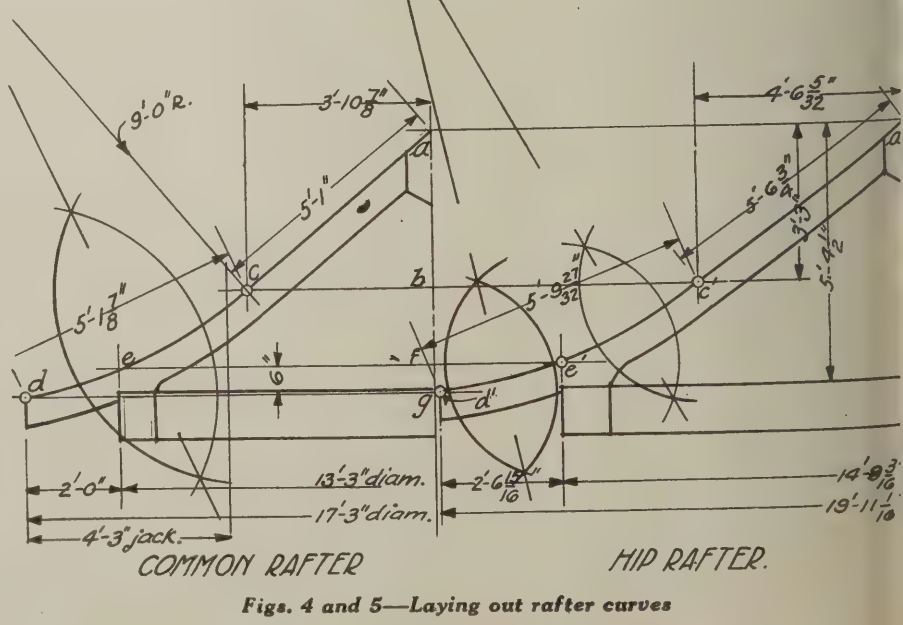


Fig. 3—Rafter curves

Rafters for a Garden House

THE following, in connection with Figs. 3, 4 and 5, is from F. M. H., of Marion



Figs. 4 and 5—Laying out rafter curves

nd. "The National Builder for April ntained a kink by W. W. M. for rafter irves, and it called to mind a similar de-gn which the writer was called upon to ake and which went a step further.

"On the enclosed sketches the construction nes are shown. The same method as W. M.'s was used to get the curve, rise and n of the rafter. Then by solving the right iangle *gdd'*, in which the *dd'* and *gd* are nown, by solving for the hypothenuse *gd'*, e point *d'* is located with respect to the nter line *ag*. Then by using proportions nd solving right triangles the points *e'* and are located. It is evident that the points *e* and *c* must be on the same level with , *e'* and *c'* respectively. So the points *d'*, and *c'* are located definitely. As three ints may determine the arc of a circle, the nter of the hip rafter curve was found the following manner: By connecting *d'* nd *e'* with a straight line and drawing the rpendicular bisector *x'm*, and in a like anner connecting *e'* and *c'* and drawing a rpendicular bisector *x'n*, you get an inter-ction of the two bisectors. This will be e center of the curve for the hip rafter.

"This seems to be a rather long and tedi-us method, but by using it the rafters were uilt up in the mill, using 1-in. dressed lum-r, and the curves were cut on a band saw. t the erection it was only necessary to ack off the two upper edges of the hip fters because they were designed on their nter line and that made their edges a little gh."

Note—(Some of the dimensions shown uld be made more accurate by using the cimal 0.866, which is the sign of 60 deg., multiply by, instead of scaling a layout. the layout of the hip rafter the work is doubt sufficiently accurate, but is the line *a* tangent to the curve *e' c'*?)

Wall Board Partitions Without Studding

FIG. 6 is a sketch sent by V. C., of North Grosvenordale, Conn., of which he writes: "This is my idea of applying 'Sheetrock' or any wall board without using studding for partitions. The 7/8x3 in. panel strips are as strong as a 2x4 in., even for a bearing partition in cottage. I have finished a cottage that way, and it worked out very well, and is a big saving on labor and material. And I also made my doors of the same material as is shown in the detail."

A Wall Board Corner

W. W. M. submits the sketch, Fig. 7, for a "corner strip to use for plaster board. The strip is one piece with edges

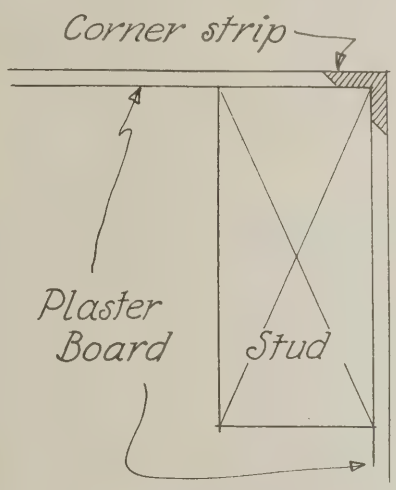


Fig. 7—Wall board corner

beveled which helps to hold down the edges of the plaster board, giving a smoother corner."

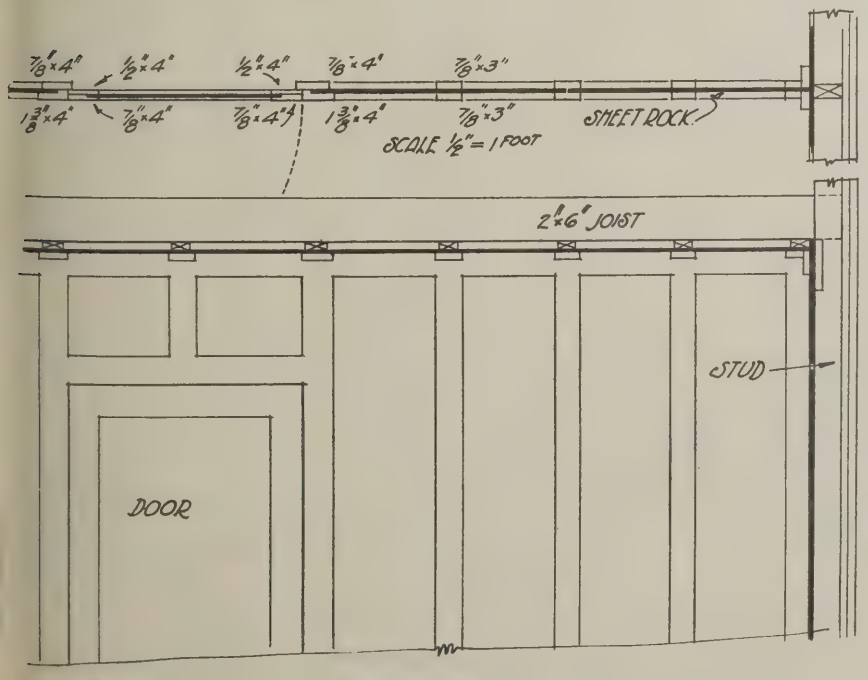


Fig. 6—Method of applying "Sheetrock," without studding, for partitions

Removing Parting Beads

THE modern automobile may be completely equipped with a collection of patented devices for making less work and more trouble. Consider a motor car with all of the contraptions marketed stowed aboard. It would look something like one of those proud unbroken lieutenants who

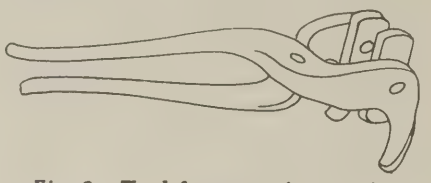


Fig. 8—Tool for removing parting beads

went to camp with all of the paraphernalia advertised to make life under canvas quite comfortable. On the other hand we find that a real mechanic usually has a collection of tools of his own design which are intended to make his work easier and better. Most of these are not on the market, or, if they are on the market, they were put there by a man who thought of the money and not by the man who thought of his work. This is a long prologue to Fig. 8. H. C. H. says he has "used this tool for several months with great saving of time and patience, as it obviates the use of a chisel in removing parting beads which stick. The buttons on the inside of the jaws should revolve freely, and as they change position when the handles are pressed down, the woodwork is not marred in the operation. Any good blacksmith can make them, and they make a handy tool, indeed."

Wall Damage from Roof Ice

THE winter storms in the northeastern section of the country have been unusually severe. F. I. L., of Seneca Falls, N. Y., writes: "We have had a new problem come up here this past winter. I have several customers that have had trouble with ice freezing on the roofs and working back over the top of the face boards, traveling back on top of the plancer, down behind the frieze board and down the side of the walls, doing considerable damage." Can any reader suggest a remedy?

Roof heat will melt considerable snow or ice. If the roof is coated with ice and snow the under side of the coat will melt and the water will not run off. With the old basket roof and cedar shingles the chances are that the moisture would cause the shingles to expand enough to prevent any water leaking through. With the composition shingles the boarding on the roof should be tight, but it is probably not tight enough to warp close when the water reaches it by backing under the shingles, and some water would

get through anyway before the boards did expand. The water after getting through would likely follow the rafters and sheathing down to its lowest point before letting go. A method for preventing such leaks would prove a very welcome "kink."

Out of the Ordinary

UNLIKE the rest of the staff, the editor of "kinks" has the privilege of reading the NATIONAL BUILDER for the first time after it comes off the press. Its pages are new to him and the text and pictures fresh. Before now he has been tempted to praise this or that house, or commend some article, but has refrained because it might seem too much like harping. However, this once, he is going to commit himself, confess a predilection to real English houses, and point out the photographs and plans on page 40 of the NATIONAL BUILDER for May.

Centuries ago we lived below ground, probably because it was warmer. Later the floors were only slightly below grade, probably for the same reason. Many barns are built that way now. At that time house and barn were likely to be one, or under one roof, and that roof covered "house part," lofts and stalls. The threshold was the threshing floor or entrance from the barn into the house. And so on ad infinitum. The English home when well built is the result of evolution and carries all of the unminded traditions of architecture, just as the Italian or the Spanish does, when rightly planned. The lines of the house are natural.

This house, designed by Mr. Fitch, gives the living room, or "house-part," a place of its own, and the rafters are not "underdrawn." The building of the ingle nook allows the use of a "speer" to protect the warmth of the fire from the drafts at the entrance. And the same construction brings out a fine timber scaffold. The "scaffold hole" gives openness to the stair case. The dining room and kitchen are away from the rest, and the dining room seems very nearly perfect. The heavy table and the benches could have been like the ones we read about which "are an original part of the building, for the table could not have been brought in either through the door or the windows." There should be a pair of wooden trenchers, or family dinner plates, made hollow on both sides, one side for the meat and the other side for the pudding.

The floor plan is full of advantages besides giving an opportunity to build a fine roof. The stair case is just as it should be, but to duplicate the ancient houses the first four steps should form a ladder, a construction which may well be changed.

The house as a whole so impressed the writer that he has looked at the pages often and admired the work of a man who had built the place, and his success in getting to the real essentials of a home. There is a trend in late years toward careful design and a combination of comfort and appearance that makes a house quite as valuable to a community as it does to its owner.

Soil Stack Connections

IN regard to the soil stack question which appeared in the NATIONAL BUILDER for April, G. A., of Glen Ellyn, Ill., writes:

"No connection should be made to the soil stack inside the house unless it is properly trapped. All joints in the stack should be made with oakum and lead, and should be gas tight. The soil stack is meant to be a vertical pipe from the lowest connection to the air above the house. Gas escapes from it to the air. It may not be opened too close to dormer windows for this reason. Since wind blowing across the top of a soil pipe, or any pipe for that matter, creates a pressure in the pipe, the gas contained in the pipe will be under pressure at times. (You can see this change in pressure by the rise and fall in the level of the water in a closet on a windy day.) So you see no untrapped openings should be allowed in the pipe.

"The soil pipe may be used as a vent pipe. For that reason the opening at the top must be large enough to prevent frost closing it. The frost comes from the moisture rising out of the pipe, and you can see it form on the top of the pipe in cold weather. The traps are vented to prevent the water which runs through them from syphoning over into the waste line, and to carry off bad odors from the branches. The traps should be as close to the fixture as possible."

As a corollary to the pressure in the soil stack we might cite the fact that, since the gas in a chimney is forced out, the air velocity directly above a chimney on a windy day is greater than the actual wind velocity.

Brick Walls

WE have a letter which runs: "There used to be an old gentleman whose pet phrase seemed to be, 'what looks worse than a brick wall?' Perhaps it was the constant question which finally settled in my mind the idea that nothing could look worse than a brick wall. In *House and Garden* for May there is a photograph of a brick wall which hit my fancy partly because of the fact that it was part of the remodeling of a town house, but more because it lends a look of freshness to the court in which it stands. In the old country, especially in London, there are numberless 'gardens' at the backs of houses, walled in with brick. They are the most cheerless, damp places you can find. I used to think that if some one had the nerve to poke a few holes in these walls it would look much better."

The drawing shown here was taken from a photograph on page 87 of the issue above mentioned. It is from a town house remodeled by the owner, William Lawrence Bottomley, architect.

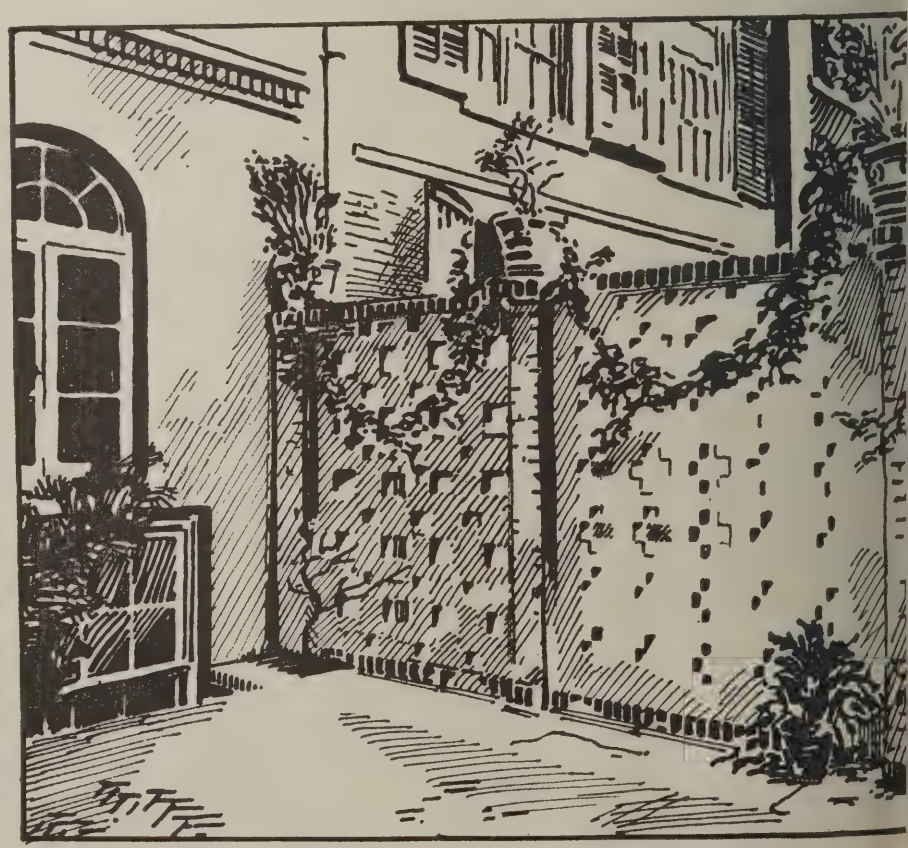


Fig. 9—A good looking brick wall

Sidewalk Sheds for Protection and Publicity

By Charles Gilbert, Architect, Brooklyn, N. Y.

SIDEWALK sheds that are built to carry heavy loads—such items as frame girder beams and building material—must be substantially built. Usually sheds are built of heavy timbers as supports, with solid joists and heavy planking. For many years, up to the present time, small contractors, as well as the leading contractors of large cities, are failing to give this matter due attention.

Some use rope strung from the building to the street, and in some cases danger flags, which are easily unnoticed by hurrying pedestrians, who may be struck by falling pieces of building material. The consequences are that a serious accident may occur; building operations are stopped; and court proceedings ensue, much to the discomfort of the contractors.

Those taking proper precautions have unfortunately made the construction of sheds merely substantial though unattractive.

It is to be understood, that to make this sidewalk shed ornamental requires additional costs. In this picture is a very interesting example of what can be done. This sidewalk shed is strongly constructed and finished with new lumber. It has received two coats of dark olive green paint with buff trimmings. The cost in reality is nothing compared to the vast amount of advertising and publicity derived by this pleasing sign. Incandescent or electric lights flashed upon the sign add enormously to the display.

This particular shed was erected at a new building operation in New York City. On this site was built a 14-story apartment house. Combining the protection of pedestrians as well as a pleasing sidewalk shed directs favorable attention to the building operation, impressing the public mind in a way that a construction project is going forward by some wide-awake and careful construction firm.

Example of a neat and attractive modern sidewalk shed for protection of pedestrians

The Situation

AT present writing the air is astir with many conflicting rumors and this would seem to be a time for the contractor to proceed with caution. Easterners are very pessimistic regarding the building outlook and carry stories of impending labor strikes, advances in price of labor and materials, and suspended construction. The rate of increase in building operations showed signs of slackening in April, according to F. W. Dodge Corporation. The increase over March in 36 Eastern states was only 7 per cent, whereas April normally shows an increase of 15 to 20 per cent over March.

In Chicago, Walter J. Greenebaum, of Greenebaum Sons Bank & Trust Co., one of the large Chicago real estate investment houses, is quoted as issuing the following statement:

"I believe that with the increased cost of building during the last few months we're rapidly reaching a situation similar to that which existed three years ago.

"According to figures I've examined, the peak of building material prices was reached in June and July, 1920, and will again be reached in the early summer of this year. As a result, we can look for a construction slump, especially of larger projects, such as apartment houses and office buildings, during the latter part of this year. Material prices will have to be decreased considerably before a renewed activity will commence.

"Under the circumstances, old established and conservative real estate loan houses will not encourage new construction except where most essential."

This may be taken to mean that speculative building of certain types is no longer looked upon with favor by some banking interests and that money for this class of construction will be difficult to obtain. All construction is more or less dependent upon bank loans and should these loans not be available, curtailment of building work is certain to result.

On the other hand, S. W. Straus & Co., one of the largest bond houses in the country specializing in building loans, announces that since January 17, 1923, they have loaned over $54,000,000. With regard to the building situation, they say there is every indication at present that the unusual activities in the building situation will continue for some time.

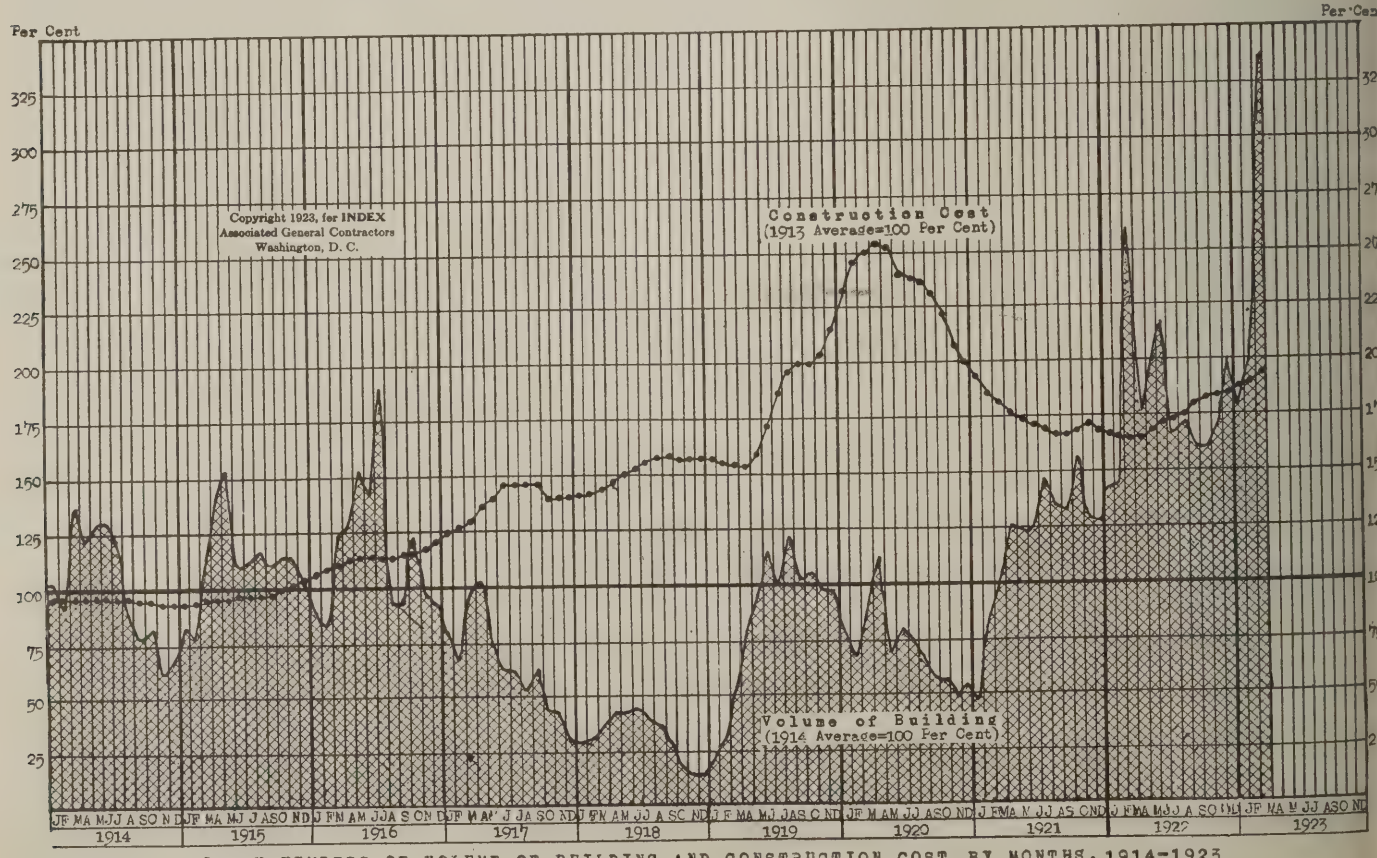
This optimistic statement is hardly in accord with the present trend of thought regarding the situation but, considering the source, it is not to be passed over lightly.

Construction Costs

Material prices seem not to have reached their peak and the general trend of the market points to an increase rather than a reduction. M. V. Ayers, statistician of the Associated General Contractors, predicts, however, that the costs of labor and materials will not advance greatly beyond the present levels, but also states that no noticeable decline is to be expected for a number of years. *General construction costs, as given by Engineering News-Record, are 31 per cent higher than one year ago, 20 per cent under the peak of 1920 and 116 per cent above the 1913 level.*

Labor in New York and Cleveland

Wage increases are demanded in nearly all cities and in most cases are being granted. In New York, the Brotherhood of Painters, Decorators and Paper Hangers, an organization of about 10,000 men, by a referendum vote, which was one of the heaviest polled in the history of the union, agreed upon a walkout unless their demands for an increase of $1 per day and a five-day week are granted. A demand for a $12 per day flat scale by the bricklayers drew from the mason contractors an offer to continue paying $10 per day with a $2 bonus in certain cases. New York is faced with an impending strike



INDEX NUMBERS OF VOLUME OF BUILDING AND CONSTRUCTION COST, BY MONTHS, 1914-1923

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involving over 100,000 building mechanics unless a blanket increase of $1 per day is granted in practically all trades.

In Cleveland, Ohio, over 500 building material truck drivers went on strike because of a refusal of employers to grant wage increases. Teamsters demanded a raise from $28 to $38 per week and truck drivers an increase from $30 to $42. Construction work was reported as being seriously hampered by this tie-up and a settlement was affected by an increase in wages of 5 cents per hour.

The Chicago Situation

Much interest is being evidenced regarding the outcome at Chicago between the Citizens Committee to Enforce the Landis Award, the two contractors' associations and the building trades' council.

Harry Jensen, president of the Carpenters' District Council, one of the strongest labor organizations, which has refused to work under the terms of the Landis award, is said to have issued an ultimatum to general contractors operating under the Landis award that unless they employed union carpenters on Chicago work their out of town construction would be tied up. Jensen said this action has the approval of his international organization.

The Associated Builders, which numbers among its membership many small contractors who operate only in Chicago, have pledged their support to the Citizens' Committee, but the members of the Building Construction Employers' Association, among whom are several large builders, are reported as disagreeing with the association's policy in supporting the Citizens' Committee and have threatened to break away unless the association severs its affiliation with the committee. Some definite action regarding the policy for the future is expected to be taken before June 1, the date of expiration of the Landis award contracts.

Deferred Construction

High construction prices are declared to be the reason for the shelving of more than $75,000,000 of contemplated building construction in Chicago. In New York, over $100,000,000 worth of work has been delayed because of high costs, and work actually under way on the new Hotel Roosevelt has been stopped. Many architects in both cities are advising their clients not to build, but this situation exists with the larger structures such as hotels and office buildings rather than with residences and small apartments.

It is reported that the Montreal Mining Co. has abandoned their plans to build 45 new dwelling houses at Montreal on account of the shortage of labor and the continued high cost of materials. *While a cessation of big building is regarded as imminent, nevertheless, no great slowing up in smaller classes of construction is expected for some months to come.*

Industrial Conferences

A conference of construction industry interests which was to have been called by Herbert Hoover to discuss building material and labor costs has been definitely abandoned, as the present moment is regarded as an inauspicious time for anything savoring of government action.

Representatives of almost every branch of the building industry who met at the home of Franklin D. Roosevelt passed the following recommendations after a study of building conditions:

That banking interests curtail the financing of speculative building until after the close of Summer.

That wide publicity be given to the increasing trend of construction costs, both of labor and material.

That governmental, municipal, state, county and town construction departments be urged to delay their work as much as possible until September or October.

That the co-operation of newspapers and trade publications be sought to keep the public informed of the monthly increases in construction costs and that they be requested to use their influence in curbing the present demand for construction.

There seems to be quite a general opinion that the situation is becoming serious and that a few months will see a decided dropping off in volume of all classes of construction unless prices of both labor and materials are to some extent stabilized.

Material Prices

Prices for lumber in the Chicago market are:

YELLOW PINE

	Delivered
4" B and B't'r flooring	$80.00
5/8" B and B't'r ceiling	65.00

FENCING AND BOARDS

	No. 1.	No. 2.	No. 3.
1x4	$55.00	$40.00	$36.00
1x6	60.00	44.00	40.00
1x8	61.00	46.00	42.00
1x10	61.00	46.00	42.00
1x12	74.00	48.00	44.00

NO. 1 DIMENSION, 8 OR 16'

2x4	$51.00	2x10	$52.00
2x6	49.00	2x12	53.00
2x8	51.00		

TIMBERS

	Long Leaf.	Short Leaf.
8" and under	$60.00	$55.00
10"	67.00	62.00
12"	70.00	65.00
14"	74.00	68.00

DOUGLAS FIR

4" flat sawed flooring, clear	$70.00
5/8" ceiling, clear	65.00
6" drop siding, clear	75.00

NORTHERN HEMLOCK
No. 1 Piece-Stuff, 16'

2x4	$50.00	2x10	$52.00
2x6	48.00	2x12	54.00
2x8	50.00		

NORTHERN PINE
Boards, 16'

	No. 1.	No. 2.	No. 3.
1x4	$83.00	$70.00	$50.00
1x6	80.00	66.00	52.00
1x8	80.00	70.00	53.00
1x10	82.00	70.00	54.00

NORWAY PINE
No. 1 Dimension, 16'

2x4	$53.00	2x10	$55.00
2x6	52.00	2x12	58.00
2x8	54.00		

SHINGLES
Red Cedar

Clears 5 to 2	$6.50
Clears 6 to 2	6.00

White Cedar

Extra star A star	$6.50
Standard star A star	5.00
No. 1	4.00

LATH
Northern Pine

No. 1	$14.00	No. 3	$9.50
No. 2	12.50	32-in.	6.00

OAK FLOORING

	13-16x2¼"	⅜x2"
C'l P'l red	$135.00	$105.00
Select P'l white or red	125.00	90.00
No. 1 Com	100.00	60.00

MAPLE FLOORING

	13-16x2¼	⅜x1½ or 2"
Clear	$125.00	$95.00
No. 1	115.00	75.00
Factory	65.00	.....

Below are given average prices of building materials in New England:

Prices Include Local Delivery in Truckloads

Portland cement	in truck loads, per bbl.	$3.80
Portland cement	in less than truck loads, per bbl.	4.00
Lime common	180 lbs., net, per bbl.	3.00
Lime common	280 lbs., net, per bbl.	4.00
Lime finishing	180 lbs., net, per bbl.	3.25
Lime finishing	280 lbs., net, per bbl.	4.35
Lime hydrate common	in paper, per ton	20.00
Lime hydrate, Ohio, finishing	in paper, per ton	25.00
Sewer pipe (standard)	discount off list	40%
Sewer pipe (double strength)	discount off list	25%
Flue lining	discount off list	40%
Wall coping	discount off list	35%
Fire brick, boiler No. 1	per M	70.00
Fire brick, high grade	per M	85.00
Fire clay	per ton	30.00
Brick, New York (kiln run)	per M	25.00
Brick, Tuttle, kiln run	per M	28.00
Brick, water struck	per M	45.00
Brick, ruff texture	per M	50.00
Plaster calcined	250 lbs., per bbl.	4.65
Plaster calcined	320 lbs., per bbl.	6.65
Plaster calcined (finishing)	250 lbs., per bbl.	4.80
Plaster calcined (finishing)	320 lbs., per bbl.	6.80
Plaster sanded mortar	in 15c bags, per ton	19.00
Plaster fibre mortar	in 15c bags, per ton	22.00
Plaster boards	each, 32x36	.25
Metal lath, Bostwick	each, 4.5 lbs. per 100 sq. yds.	35.00
Metal lath No. 24G expanded	3.4 lbs. per 100 sq. yds.	28.00
Metal lath No. 24G expanded	2.8 lbs. per 100 sq. yds.	23.00
Metal lath No. 26G expanded	2.2 lbs. per 100 sq. yds.	19.00
Wood lath, spruce, 1⅝"	2.2 lbs. per 100 sq. yds.	20.50
Corner bead, galvanized	per ft.	.04
Partition blocks	terra cotta, 4x12 each	.18
Partition blocks	terra cotta, 8x12 each	.30
Partition blocks	gypsum, 3", per sq. ft.	.15
Partition blocks	gypsum, 4", per sq. ft.	.17
Hair, No. 1 cattle	per bushel	.55
Crushed stone, truckloads	per ton	2.50
Mortar sand, truckloads	per ton	1.75
Beach sand	per ton	5.00
Asphalt shingles, individual	8x12½, per sq.	7.25
Asphalt shingles, strip	10x32½, per sq.	6.75
Roll roofing, slate surfaced	80 lbs., per roll	3.00
Roll roofing, talc surface	40 lbs., per roll	2.00
Roll roofing, talc surface	50 lbs., per roll	2.35
Roll roofing, talc surface	60 lbs., per roll	2.75
Building paper	black waterproof, 45 lbs. per roll	2.75
Mortar color, red	per 100 lbs.	3.00

Devises Own Concrete Mixer

FIFTEEN, or even twenty, years ago there were lots of good concrete mixers on the market, but they were not good enough for one particular contractor, and especially for continuous mixing in very large quantities. So this independent contractor—A. Lanquist, of Lanquist and Illsey Co., Chicago, Ill., proceeded to devise an entirely novel mixer to suit his own ideas of what a mixer should be capable of doing—a capability that was then impossible with any existing machine.

At that time Mr. Lanquist had a contract to construct a concrete slab 334 ft. wide, 1320 ft. long and 38 in. thick for the open-hearth furnace building of the U. S. Steel Corporation's plant at Gary, Ind.—certainly an exacting requirement from any concrete mixer where time was an element of importance. Besides this huge slab there were the stove foundations, 52 ft. wide at the bottom, 28 ft. at the top, 20 ft. high and 282 ft. long. This made a total of over 60,000 cu. yd. of concrete to be mixed within a limited time.

With his individually designed continuous mixer, Mr. Lanquist was able to fulfill all requirements. He constructed three machines which, running simultaneously, mixed 2822 cu. yd. of concrete every day of nine hours. The best day's output for a single machine was 1128 cu. yd. As a big railway gondola car carries only 40 cu. yd., that was equivalent to a trainload a day for each machine.

The machine was patented, and since then the Lanquist and Illsley Co. are the only contractors who have ever been allowed to make use of it. They have strictly confined its advantages to themselves, and have used it continuously ever since, most recently at the new Wrigley Building, where one of the smaller machines mixed all of the concrete for the caissons which are now completed.

Surmounting the mixer is a large hopper with two movable partitions that can be adjusted so as to form three individual compartments of proportions equal to the desired proportions of the materials in the mixture. For instance, if the mixture is to be 1:2:4, the compartment for the sand will be twice as long as that for the cement, and the compartment for the stone will be twice as long as that for the sand. At the hopper level is erected a platform from which materials are fed into their respective compartments by hand, or by conveyor belt. Directly below the hopper is a steel drum inside which rotates at about 25 revolutions per minute, a closely

Model of Lanquist concrete mixer

Lanquist concrete mixer being used for foundations of the new Wrigley building, Chicago, Ill.

fitting feed roller. Channeled radially within the body of this roller are five rectangular pockets the full length of the roller, all of equal size, excepting as to length, for they have partitions corresponding to those in the hopper. Thus, as they turn they take the materials in proper proportions from the hopper and then dump them into the mixer which is below and parallel to the feed roller. This mixer is in the form of a long drive-shaft geared to rotate at four times the speed of the feed roller, and studded along its entire length with radial flat paddles all enclosed in a suitable housing the full length of the feed roller. The mixer extends about an equal length beyond the feed roller and from this point, where there is a nozzle with water connection, to its delivery end it is partly open at the top. The paddles, besides mixing the cement and aggregates, convey them to the delivery end, where they arrive very uniformly mixed. Here the mixture is dumped into buckets carried by two vertical endless chains, and is elevated to a hopper suitably located for delivering the concrete to a chute from which it is discharged into trucks or other means of conveyance.—Henry S. White.

New Office Building Has Underground Garage

WITHIN a decade the traffic problem of our great cities has taken on an aspect formerly undreamed of and the multitudes of motor cars and motor buses on business streets has created a situation with which not only street planners but builders and architects must reckon.

One of the first—possibly the very first—comprehensive attempt to find a solution to the problem indicated, by builders and designers of office buildings, is that made in Los Angeles by the Pacific Mutual Insurance Co. which has recently had constructed a 12-story office building adjoining its original home offices at the corner of Sixth and Hill streets. What has been done is to provide an underground garage on the premises for the use of tenants of the office building. In this case the storage place is not immediately beneath the building but below ground level immediately at the rear of the building, there being a vacant space between the rear of the office building and the property line. However, where basement requirements for an office building do not necessitate use of the entire underground space, what has been done by the Pacific Mutual could be duplicated in an office building basement.

Typical view of one of the two underground floors of the garage, showing fireproof construction. Note the automatic sprinkler system and the windows opening on a light-well. Suction ventilators provide for a complete change of air every few minutes, quickly disposing of fumes from motors

The builders of this novel garage which is reached by ramps from a side street were the Scofield Engineering Co., with Paul Jeffers the structural engineer. Dodd and Richards were the architects. The garage occupies two floors underground and has a capacity for nearly 200 cars. A long well extending almost the full length of one side of the garage aids in ventilating both floors and affords a degree of light, although of course artificial light is relied on principally. Suction fans also ventilate the rooms.

The broad ramps of moderate slope are equipped with special automatic signals in the form of bells and red lights at the top and bottom of each incline. Spring supported members set in the driveway at the top and bottom of the ramps afford the means for operating the signals. As soon as the front wheels of a car pass over this member the resulting electrical contact causes the gong to sound and the light to shine, thereby signaling at the opposite end of the ramp that a car is approaching the passageway.

The garage is in charge of attendants who check the cars in and out. Only tenants of the building are allowed stalls. The charge is $20 per month. The structure is fireproof, the material used being reinforced concrete. The street level entrance is designed along simple but artistic lines, the housing over the entrance being combined with a service station operating on the ground level.

This service station is situated within a ground level parking place occupying the area immediately above the underground garage. This, like the garage, is a special feature showing the extent to which the building owners have gone in trying to solve the parking problem. This parking space is for the use of patrons of the tenants exclusively. Here they are permitted to park one hour free of charge.

Showing street level entrance at the rear of the Pacific Mutual building, leading by ramps to the underground garage. The far end of the structure over the entrance is used as a service station for the free ground-level parking space

Announcements and Publications

"Better Homes in America."—This is the book prepared for the guidance of local communities in conducting "Better Homes" demonstrations for the week of June 4-10, 1923. The purposes of this "Demonstration Week" to be held in every town that desires it, are stated as follows:

1. To show the advantages of thrift for home ownership. Only 48 per cent are home owners. Ownership encourages responsibility.
2. To strengthen home life and make it attractive.
3. To overcome the present shortage of homes—America needs 800,000 homes.
4. To assist and encourage home-makers and home builders. Ninety-two per cent of the women of America do their own home work.
5. To improve the home environment, thereby strengthening the child. To increase the efficiency of the wage-earner of the house.
6. To stimulate sensible and valuable purchasing for home improvement.
7. To mobilize community pride for a common objective—Pride of Home.

This book explains fully the steps necessary for putting on a "Better Homes" campaign in any town. Copies can be obtained free through the National Headquarters and Bureau of Information, The Delineator, 223 Spring Street, New York City.

"Better Built Homes," Volume XV.—This is the latest publication in the very comprehensive series of plan books offered by the Curtis Service Bureau, Clinton, Iowa, in the interests of the manufacturers of Curtis Woodwork. The book is supplied free if requested through lumber dealers, or at $1.00 per copy if requested direct.

The volume contains plans and designs, illustrated in color plates and photographic reproductions, for 39 houses of four and five rooms and of one and two stories. These houses are all by Trowbridge & Ackerman, Architects, New York City, and all provide for utilizing only standard designs and standard sizes of building materials, particularly exterior and interior forms of woodwork. Surely, if the modern tendency towards standardization in house construction results in building of homes like those illustrated in this book, we shall lose nothing in the way of individuality but will gain a great deal in architectural beauty and economical planning. The book is 9x12 inches in size.

Units 1 and 2 Short Units Series. A. Edward Rhodes, Co-ordinator-Supervisor, Wilmington, Del. Public Schools. Unit 1, Blueprint Reading, 18 pages, 6¼x9, 43 illustrations, paper, 40 cents. Unit 2, Essentials of Working Drawings and Blueprint Reading. 18 pages, 23 illustrations, paper, price 40 cents. These little booklets are the first of a series of short courses, by the units system, textbooks to be published as rapidly as approved texts can be secured. The aim of the publisher is to provide low-priced textbooks especially adapted to short, intensive courses for men engaged in industry. Unit 1 makes a radical and logical departure from the usual method of learning to read blueprints by "making drawings." The author claims to have proven by his 30 years' successful teaching that blueprint reading can and should be taught in much the same manner as other school subjects, as say, English or mathematics. Unit 2 is more advanced than Unit 1, containing excellent problems in both reading and making drawings, beginning with simple working drawings and ending with complete working drawings of a steam engine. These booklets will be a valuable contribution to vocational education. Published by A. E. Rhodes, Delaware Avenue and Monroe Street, Wilmington, Del.

The American Wood-Preserver's Association, 1146 Otis building, Chicago, Ill., has published the first issue of their new house organ, "Wood Preserving News." It is devoted to timber preservation and allied subjects and is for public distribution as well as for members of the association and wood-using engineers. The new publication states its "creed" as follows: Popularization of wood preservation as the imperative means of timber conservation; promulgation of the theory, technic, and practice of wood preservation; promotion of standard practice as recommended by the American Wood-Preservers' Association; presentation of proofs of the economy of treated wood; development of increased consumption of treated material; extension of the practice of wood preservation to every phase of construction and manufacture where structural wood is exposed to decay and the attack of insects or marine borers; advancement of the cause of wood for all legitimate structural purposes; publication of developments and happenings within the industry; co-operation within and without the industry to achieve these tenets.

"The Building Labor Calculator" is what Gordon M. Tamblyn, Sweeney Bldg., Denver, Colo., calls his new loose-leaf book containing data on labor costs for the use of contractors, architects, engineers and appraisers. The data in this book are based on what Mr. Tamblyn calls *constants of labor,* or general averages. The subjects treated are: brickwork, carpentry, cement work, concrete, excavations, concrete forms, heating, lathing and furring, marble, plastering, painting, reinforcing steel, roofing, sheet metal, sheet piling, stone work, terra cotta, tile floor arches, and tile partitions. The book is in loose-leaf form, with leather ring binder, permitting monthly additions and changes in the sheets. This book should prove a useful guide to estimating costs in that phase of building still largely unstandardized—labor. The sheets are 3¾x7 and the binder 4¾x7¼. Both are supplied for $5.00.

"Income in the United States," Volume I.—A brief and fascinating summary of an exhaustive statistical analysis of the income of the American people for the last decade. Some of the questions answered are: What has been, year by year, the aggregate money income of the nation? What part of the changes in this aggregate are due to fluctuations in prices and what part to fluctuations in production of goods? How is the aggregate income divided among individuals? What proportion of the whole income goes to wage and salary earners? What changes does this proportion undergo? How does per capita income in the United States compare with that in other countries? This survey was made under the auspices of the National Bureau of Economic Research, whose 19 directors represent a wide variety of economic interests and points of view. The book is 5x7½ in size, contains 152 pages with index and numerous statistical tables and charts, and is bound in silk cloth. The price is $1.58, postpaid, from the National Bureau of Economic Research, Inc., 474 West 24th St., New York, N. Y.

"The Dunham Hand Book" No. 214 lists the complete line of heating and ventilating products manufactured by A. C. Dunham Co., 230 East Ohio St., Chicago, together with many pages of data pertaining to heating and ventilating problems. The book is bound in flexible blue karatol stamped in white and gold, and is 3¾x6½ in size, with 142 pages.

A Standard State Zoning Act, under which municipalities may adopt zoning regulations, has been prepared by the Advisory Committee on Zoning appointed by Secretary Hoover, and published by the Department of Commerce, Washington, D. C. It is a 16-page multigraphed bulletin and is supplied free of charge to all interested in zoning.

All About Saws—Every owner of a saw of any kind—circular, band, hand or what not, will find a world of information on the construction and care of saws in the "Lumberman's Handbook," published by Henry Disston & Sons, Inc., Philadelphia, Pa. The accompanying cut is taken from the handbook.

"Circular saws," it states, "are made with numerous styles and sizes of teeth, both in the solid tooth and inserted tooth types. The illustration gives the styles of teeth most generally used. From this collection of styles can be selected a tooth adaptable to almost any kind of wood, condition or purpose. All of these styles of teeth have stood up under the severest test and can be counted on to give complete satisfaction.

"However, the best saw that could be made would not manufacture lumber in a satisfactory manner, nor be safe from possible vital injury unless kept properly set and sharpened. It is therefore very necessary that all saws should be kept in the best possible condition. The contrary is too often the case. The most general cause of trouble is a dull or improperly fitted saw."

Styles of teeth for circular saws

Solid Tooth Saws

Teeth Nos. 2, 4, 5 and 17 are for cross-cutting. Nos. 11, 12, 13 and 14 for ripping. Nos. 1, 6 and 8 for cross-cutting or ripping. No. 18 for mitering or cross-cutting.

Inserted Tooth Saws

The chisel point is the best form of inserted tooth for general mill use.

No. 10 is used principally on the Pacific Coast. No. 16 is used for thin saws, resawing, etc. The American, Trenton, Prosser, Dunbar and Goulding are styles formerly made by the American Saw Co.

Gypsum Industries Move—The Gypsum Industries, Inc., has moved its offices to the American Fore Building, 844 Rush Street, Chicago. The change provides more office space to take care of expansion. The Gypsum Industries is a service bureau maintained by gypsum producers and its work consists of research, promotion, advertising and the preparation of specifications governing gypsum products for structural purposes in fireproof and other buildings. It is a member of architectural and engineering organizations, including the American Society for Testing Materials, National Fire Protection Association and Building Officials' Conference, and maintains a research fellowship in the United States Bureau of Standards. An engineering department is maintained for the benefit of the public and authentic information on the proper use and application of gypsum in building construction is given without cost or obligation. Literature on the various uses of gypsum plasters and gypsum building products is sent free upon application.

Certain-Teed Expands—George Brown, president of the Certain-Teed Products Corporation, which is one of the largest manufacturers of paints and roofing materials in this country, has confirmed earlier announcements to the effect that the company had acquired control of Cooks Linoleum Co., Trenton, N. J., the Acme Cement Co., St. Louis, and Thomas Potter & Sons Co., manufacturer of linoleum at Philadelphia. In confirming the merger Mr. Brown stated:

"These large additions to our present manufacturing facilities and administrative organizations mean the completion of our line of products for the construction, protection and equipment of buildings and the distribution of these closely related necessities through the same channels, eliminating all avoidable waste."

The amount involved in completing the merger of these companies was $8,000,000. The consolidation brings under one producing and administrative organization the leading linoleum manufacturers of the United States and also puts the corporation in the fore rank of gypsum producers. The Certain-Teed Corporation has shown remarkable growth in the last 16 years.

"Oxy-Acetylene Welding and Cutting," including acetylene and oxygen, are thoroughly discussed in a book of this title by P. F. Willis, published by The Norman W. Henley Publishing Co., 2 West 45th Street, New York City. It teaches the care of apparatus, welding of all metals and alloys, how to take care of expansion and contraction, soldering aluminum, repairing scored cylinders and other subjects. The book is attractively bound in green cloth with white lettering; contains over 250 pages with 99 illustrations and complete index. Price $1.50.

"Lumbermen's Building Estimator." A. W. Holt, a retail lumberman of long experience, has devised the scheme of estimating explained in this book. It is based on a new principle but a very simple one. It considers the square foot of wall and floor area as a unit which is constant and does not vary, no matter the size of the building. The cost per square foot is applied to floors, ceilings, roofs, inside partitions, etc., and thus the total cost of the completed building is arrived at by figuring the number of squares and the unit cost per square in its component members. The book carries out all possible variations in price of lumber per thousand feet, and tables are given covering barn construction as well as houses. Blank forms for estimating are furnished with the book, which is bound in red leather, size 5½x8½, 148 pages, and with cloth covered thumb indexes. Published by American Lumberman, 431 S. Dearborn St., Chicago, Ill. Price, postpaid, $7.00, including estimate blanks.

The Chicago Technical College, 337 Chicago Technical Building, Chicago, Ill., has issued a prospectus describing its home study courses in plan reading, estimating, building superintendence, house-planning, contracting, etc., that should answer many a question often raised by readers of this journal as to where they can learn something about these subjects. The booklet describes in detail how each subject is covered and line drawings, in blue, show examples of construction work taken from the regular texts used by the school.

"Concrete Floors and Sidewalks," by A. A. Houghton, has recently been reissued, with paper cover, by The Norman W. Henley Publishing Co., 2 West 45th Street, New York City. The molds for molding squares, hexagonal and many other styles of mosaic floor and sidewalk blocks are fully illustrated and explained. Sixty pages, 5x7¼ in size.

"Home Instruction for Sheet Metal Workers," by Neubecker and Morio, published by the U. P. C. Book Company, Inc., 239 West 39th St., New York City, covers every phase of sheet metal working, such as cutting curves and circles, soldering, tools, detail drawings for various forms, making these forms, etc. Practical problems only are, for the most part, completely worked out. There are 404 pages of text with numerous illustrations and the book is 6¼x9¼. It is supplemented by some 14 folding charts, each 17x22 in size.

"Handbook of Hollow Building Tile Construction." — NATIONAL BUILDER has published plans for several hollow tile houses in the series by The Architects' Small House Service Bureau, Inc., and many articles have appeared on hollow tile as a building material. This handbook, published by The Hollow Building Tile Association, Conway Building, Chicago, Ill., gives complete information on the subject. It defines the terms used in the industry, explains the characteristics and advantages of hollow tile and illustrates the various shapes of hollow tile for various purposes and shows different kinds of construction. Every builder or architect ought to have this handbook for reference purposes. It contains over 100 pages and is 8¾x11 in size and is sent without cost to any architect, contractor or engineer.

"A Chapel in Every Home"—This is the slogan of Joseph R. Wilson, LL. B., 1525 Spruce Street, Philadelphia, Pa., author and publisher of a 128-page monograph 7½x10¾ in size, about which he says: "There is nothing commercial in this publication. It has been printed at the personal expense of the writer for distribution among churchmen, public officials and publicists for no other purpose than as a contribution to the general betterment of humanity." His plea is for one room in every home "consecrated to the worship of God. Every home should have a bathroom for the cleanliness of the body and a sanctuary for the cleanliness of the soul."

"Beautiful Windows," by John P. Whitmore, is a book of homes compiled for architects, builders, contractors, interior decorators and dealers in window furnishings. The examples are all from California architecture. Exterior and interior views are shown photographically, supplemented by pen and ink drawings and descriptions. Here are many ideas for attractive treatments for all manner of windows. The book is well worth careful study. It contains 62 pages and is 8¼x11¼. Price, $1.50, published by Talbert-Whitmore Company, 2626 Lacy St., Los Angeles, Cal.

"The History of Des Moines Elaterite" is the title of a 16-page booklet by The Elaterite Paint and Manufacturing Company, Des Moines, Iowa. The origin of and uses for "nature's own preservative and waterproofing," as made by this company, are fully described and illustrated. Elaterite as a metal preservative; as an insulating, acid, heat and fire-resisting material; as a preventive of condensation; as a stove enamel; and its behavior in prepared roofings, cloth, etc., are discussed at length. The book is 8½x11 in size.

WANTED!
Kicks, Suggestions, Compliments

A NEW HAMPSHIRE contractor and builder writes: "This is to let you know that I appreciate very much the articles that appeared on pages 59, 60, 61, 62 and 63 of the April issue of NATIONAL BUILDER. Those are the articles that help me most in my business."

We wish every reader would let us hear from them once in a while. Let it be kick, suggestion or compliment. While we like the last the best, we may need the others more.—The Editor.

"500 Plain Answers to Direct Questions on Steam, Hot Water, Vapor and Vacuum Heating," by Alfred G. King. New and revised and enlarged edition. This work is arranged in question and answer form; it is intended as a guide and text-book for the young inexperienced fitter and as a reference book for all fitters. It has just been revised and enlarged and the author has illustrated and described many new heating systems and methods. Many of the numerous illustrations are made from original drawings specially prepared for this book. Long and tedious discussions and descriptions have been eliminated, and the theory and laws of heat and the various old and modern methods and appliances used for heating and ventilating are treated in a concise manner. 250 pages and 150 specially made illustrations and tables. Price $2.50; size 6¼x9¼. Published by The Norman W. Henley Publishing Co., 2 West 45th Street, New York, N. Y.

Wireless and Radio books are now enjoying great popularity and there are phases of the subject in which the contractor, architect and builder are interested. "Wireless Telegraphy and Telephony," by A. P. Morgan, "Ideas for the Radio Experimenter's Laboratory" and "Construction of Radio Phone and Telegraph Receivers for Beginners," both by M. B. Sleeper, are three practical pocket-size books of value. The first is cloth bound and is priced at $1.50; the other two have paper bindings and cost 75 cents each. Each of the three has over 125 pages, and all are published by The Norman W. Henley Publishing Co., 2 West 45th Street, New York City.

"Concrete Construction for Architects" by DeWitt C. Pond. A concise treatise on the design of reinforced concrete slabs, beams, girders, columns and footings, and a description of the actual design of a concrete building involving the use of flat slab construction. The author is identified with the office of one of the largest architectural firms in the country, and has had charge of the various engineering problems in the construction of many large factories and industrial buildings built of reinforced concrete. The book is fully illustrated with drawings of special engineering features, and is an authoritative and up-to-date work. It is 6x9 in size, contains 203 pages, and is bound in red cloth stamped in gold; price $4.00. Charles Scribner's Sons, New York City, publishers.

Statement of the Ownership of National Builder

Statement of the ownership, management, circulation, etc., required by the Act of Congress of August 24, 1912, of NATIONAL BUILDER, published monthly at 542 South Dearborn Street, Chicago, Illinois, for April 1, 1923. State of Illinois, County of Cook. ss.

Before me, a Notary Public in and for the state and county aforesaid, personally appeared George P. Miller, who, having been duly sworn according to law, deposes and says that he is the Manager of the NATIONAL BUILDER and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business managers are: Publisher, Tradepress Publishing Corp.; Editor, Nathan C. Rockwood; Managing Editor, Nathan C. Rockwood; Business Manager, George P. Miller; all at 542 South Dearborn St., Chicago, Ill.

2. That the owners are: (Give names and addresses of individual owners, or, if a corporation, give its name and the names and addresses of stockholders owning or holding 1 per cent or more of the total amount of stock.) Tradepress Publishing Corp., W. D. Callender, T. J. Sullivan, George P. Miller, N. C. Rockwood, W. B. Mayor, D. R. Hicks, H. P. Sessions, A. H. McQuilkin and C. O. Nelson, all at 542 South Dearborn St., Chicago, Ill.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.) There are none.

4. That the two paragraphs next above, giving the names of the owners, stockholders and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner and this affiant has no reason to believe that any other person, association, or corporation has any interest, direct or indirect, in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is (this information is required from daily publications only).

GEO. P. MILLER,
(Signature of Business Manager)

Sworn to and subscribed before me this 4th day of April, 1923.

(SEAL) Charles O. Nelson.

(My commission expires April 6, 1926.)

3526—Ed. 1216.

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Johnson's Floor Varnish is tough, elastic and durable. It gives a beautiful, high gloss which will not chip, check, mar, blister or scratch white. It is very pale in color so can be used on the lightest floors and linoleums.

Dries Hard Over Night

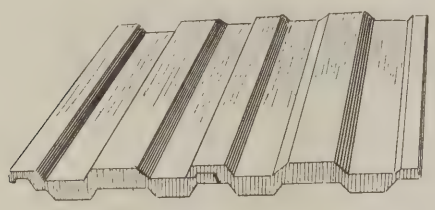
Johnson's Floor Varnish dries free from dust in two hours and hard over night. It imparts a beautiful, high lustre—has good body—will give long wear—is absolutely water proof—and will stand all reasonable tests.

Buyers' Guide for Builders

What Manufacturers of Materials, Equipment and Machinery for Building Construction Are Doing for the Industry

New Power Machine for Concrete Roof Tile

VISITORS at the Chicago "Own Your Home" show were almost unanimously impressed by the beauty and durable appearance of the vari-colored roof on the actual-size bungalow which formed the principal exhibit of the exposition. This roof was composed of concrete tile manufactured by a new power-driven machine



French tile; size, 9¼x15; exposure, 8x12; weight per square, 825 lb.; 150 tile to the square

only recently perfected, which produces concrete roof tile in large quantities.

Concrete roof tile is an old idea, but they have usually been produced by hand machines and no satisfactory means of making them in large quantities has until recently been developed, due to the fact that each tile has to be molded. A machine now perfected produces a tile of extraordinary quality and at a cost that should make concrete roof tile one of the most important roofing materials of the future.

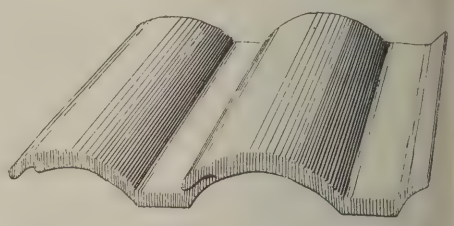
This machine has been developed largely by Carl A. Carlson, of Cicero, Ill., a suburb of Chicago. Mr. Carlson is a contractor and builder who has in the last ten years built over 1000 small homes which he has sold or rented to employes of one of the largest industrial plants in the country. Since the perfecting of these machines he has roofed every building that he has constructed with concrete tile, even to the most inexpensive five-room bungalow. Because of the quality and appearance of his roofs he has been able to sell his houses at very substantial margins over buildings of similar designs and construction built alongside of his own.

So successful has this new roofing been that Mr. Carlson has constructed a large new building for the special purpose of manufacturing "Hawthorne" concrete roof tile, as it is called. The output of this new plant will, however, be consumed entirely by builders in the immediate vicinity of Cicero, and consequently Mr. Carlson is arranging to sell other machines to builders in other sections to whom he will grant exclusive territorial rights for the purpose of producing "Hawthorne" concrete roof tile. He has established the Concrete Tile Machinery Co., 832 South Central avenue, Cicero, Ill., for the purpose of manufacturing and selling tile machines to contractors and builders and others who wish to get into the concrete roof tile business.

Two standard molds have been developed, as illustrated, one for "French" tile and one for "Spanish" tile. They weigh an average of 200 lb. per square less than clay tile.

F. W. Iggberg, general manager, claims that with the Hawthorne machine, concrete roof tile can be profitably sold at about 60 per cent of the cost of regular clay tile. He says that experience has proved that concrete tile have no warpage whatever and that they absorb exactly the right amount of moisture to avoid sweating on the under side, but not enough to increase the weight of the tile and to cause dripping through on the under side. He states that the big advantage in concrete tile is that they can be made locally anywhere, for cement, sand and water are available in all localities, and only common labor is required for production.

Practically no nails are used in laying Hawthorne roof tile, for the tile interlock and only the starting unit and the hip and ridge forms need be nailed. The tile are hung on wooden strips. There being no nails on the roof proper, there is no leakage around nails, hence no rusting nails to break off or allow water to leak through. A workman and helper can cover an ordinary house with Hawthorne concrete roof tile in three eight-hour days under ordinary conditions.

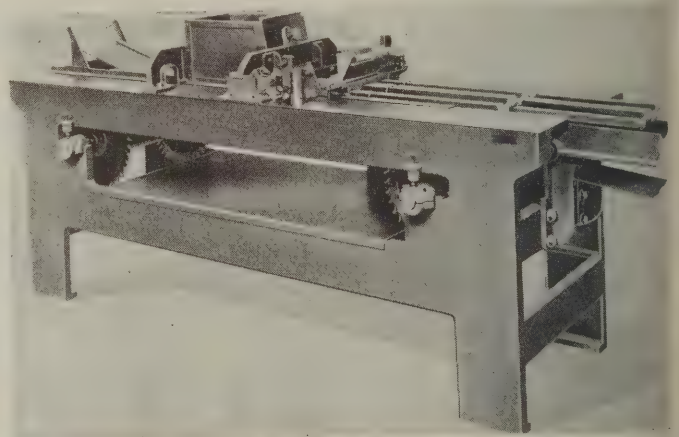


Spanish tile; size, 9½x15; exposure, 8x12; weight per square, 800 lb.; 150 tile to the square

The color chart of the Concrete Tile Machinery Co. will eventually show 20 colors made up of different combinations of red, bright red, brownish red, brown, gray, blue and green.

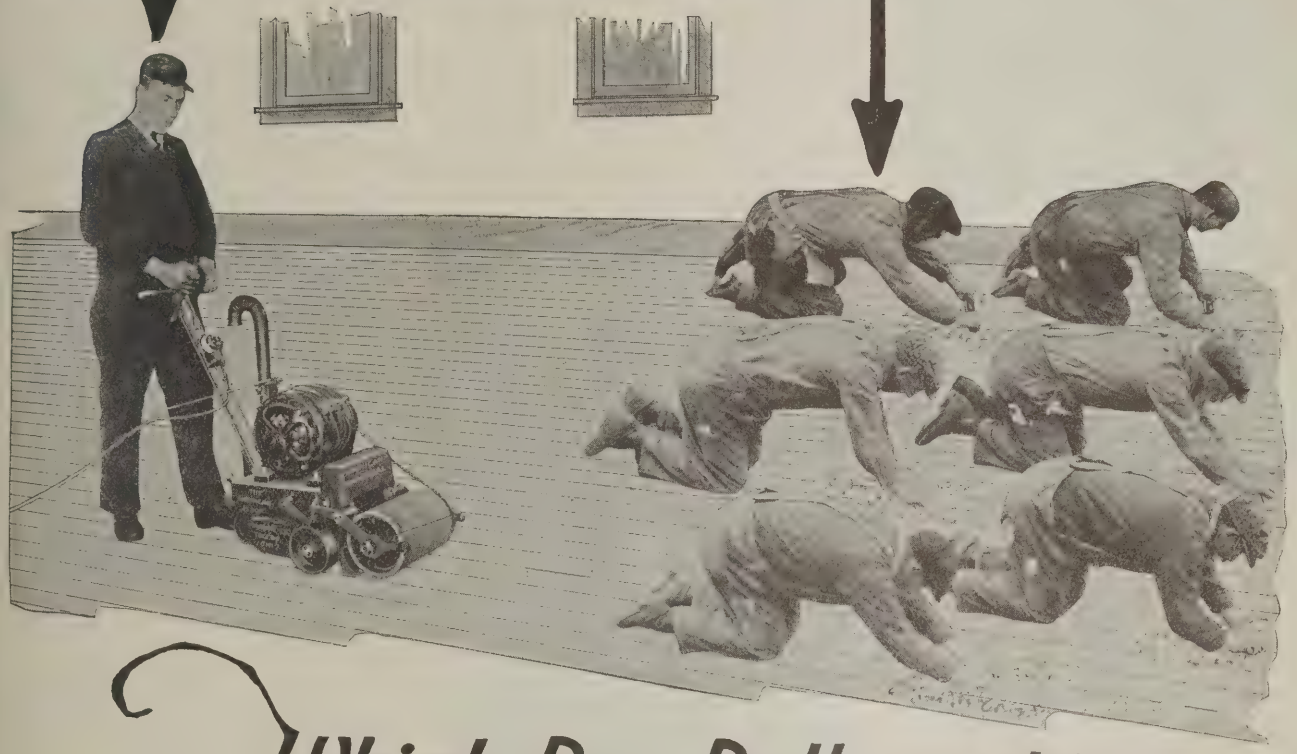
An attractive portfolio has been prepared for those interested either in the machine or concrete roofing tile.

Showing how Hawthorne concrete roof tile are hung on horizontal strips. Practically no nails are used



The Hawthorne concrete roof tile machine is power driven. It tamps the tile and is capable of turning out 40 squares a day

SIX MEN OR ONE ?



Which Pay Roll would You rather Pay ?

The "American Universal" floor surfacing machine does the work of six men scraping floors by hand. In other words, where it costs you $48.00 for hand scraping, the "American Universal" will do the same amount of work for you at a cost of only $8.00—an actual saving of just exactly $40.00.

Are *you* paying the $48.00 or the $8.00? There is a whole lot of difference. Why not add the $40.00 to your profits?

The "American Universal" is simplicity itself both in mechanical construction and actual operation. No experience is required in order to turn out an A-1 job at a rapid rate of speed.

FREE FIVE DAY TRIAL OFFER

We will welcome the opportunity to ship you an "American Universal" to try it out for yourself five days *free of charge.*

Clip the coupon today and mail it to us. We'll gladly send you full particulars and free catalogue by return mail.

American Floor Surfacing Machine Co.
519 South St. Clair Street, Toledo, Ohio

HERE'S THE COUPON

Send at once without obligation on my part full particulars and free catalogue. Also explain your five day trial offer.

Name .....

Street Address .....

City ..... State .....

Movable Stairway Adds Usable Space

AN attic, if it is ventilated, adds considerable to the comfort of a house in the summer time, and it helps to keep the rooms below warm in winter by supplying a dead air space between them and the roof. It is, however, no little trouble to open and close gable and dormer windows in an ordinary attic which is not accessible by a regular stairway.

Many attic spaces contain valuable room

A light pull on the chain brings the stairway into position

which should not go to waste. This space can be used for storage purposes, or for extra bedrooms, for playrooms and other special purposes, provided it is accessible. The average house, however, does not permit the installation of even a narrow closed or box stairway to the attic, for it takes up too much floor space.

In recent years architects and builders have seen the advantages of the movable stairway, which makes such attics accessible, but at the same time takes up no floor space when not in use.

The Bessler Movable Stairway Co. of Akron, Ohio, have perfected a movable stairway which has met with considerable acceptance, and which because of the many advantages claimed for it will undoubtedly continue to grow in popularity.

There are many uses for this movable stairway. It can be used in bungalows, two-story and story-and-one-half houses; it forms a passageway to balconies and mezzanine floors in stores, hotels, theaters, banks, etc.; it is used in garages to make the space beneath the roof available as a workroom and storeroom, and it has been used even on porches to make the balcony or space above easily accessible.

The movable stairway eliminates the expense of the box or open stairway, and in addition the cost of partitioning, lathing and plastering. The cost of installing the Bessler movable stairway, it is claimed, rarely exceeds the cost of a good stationary stairway, and frequently is somewhat less. It is stated that where the ceiling has been prepared, the Bessler stairway can be assembled and hung in one hour by any carpenter; and in buildings where the ceiling has to be cut out and the opening cased up, the stairway can be installed in from six to eight hours' time. These figures, of course, refer to houses of frame construction. Explicit directions and diagrams are furnished with each stairway, and a hammer and screw-driver are all the tools required, it is claimed, for making installation.

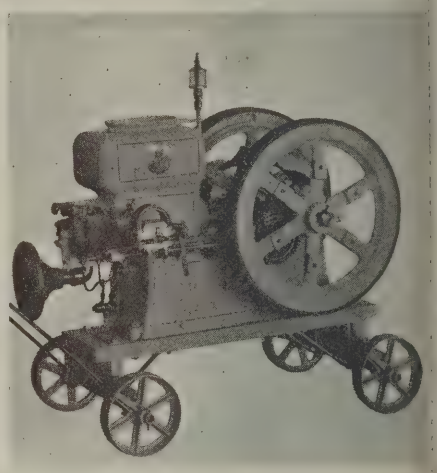
The Bessler movable stairway consists of a strong, well-built flight of stairs, which is attached to the end trimmer of an opening in the ceiling of the room or hall where the stairs is to be located. A panel is the only part visible in the ceiling when the stairway is folded. To use the stairway, a light pull on a chain brings it into position. A stairhorse is then rolled down the panel onto the floor. To fold the stairway back up into the ceiling, the

A stairhorse rolls down the panel onto the floor

stairhorse is rolled up on the panel. Spring barrels on each side of the stairhorse do the work with a very slight assistance from the operator. When in this position the spring barrels (which are double acting), together with the counter balance formed by the now projecting stairhorse, automatically swings the stairway up into the ceiling. An equalizing bar is placed on each side of the panel, to which are attached pulleys, extending from the cable leading to the spring barrels, and which perform the function of lifting the stairs up to the ceiling. The purpose of these equalizing bars is to keep an even and smooth pull on the stairs the entire distance of its ascent. This is accomplished by the pulleys traveling forward as the stairway goes up. This device causes the stairway to close up tight against the ceiling without slamming. It is not possible, it is claimed, for the stairway to come down unless it is brought down, and that any child can operate it.

"Horsepower" vs. Man Power

LABOR in the building trades in this country today is not cheap, and in many localities there is an insufficient supply of it at any price. Consequently



One of a large variety of gasoline and kerosene engines ranging in size from 1½ to 12 hp.

the contractor and builder is turning more and more toward power machinery in his building operations.

Just what make of concrete mixer or other power-driven machinery the contractor uses is often determined by the motive power which drives it. "A mixer is as good as its motor," is a statement often heard.

One line of motors for contractor's equipment, which is increasing in popularity among builders, is that manufactured by the Hercules Corporation, Evansville, Ind. This concern makes a wide variety of both gasoline and kerosene engines, ranging in size from 1½ to 12 hp. One of their 3 hp. gasoline engines mounted on a truck so as to be movable from place to place, is illustrated above.

Many distinctive features are claimed for Hercules engines, and are set forth in detail in illustrated circulars. The engines are regularly equipped with a Webster low tension magneto, but a Wico high tension magneto, battery ignitor or dual ignition are optional. If the installation requires flywheels of reduced diameter, they are supplied. A crank case cover is furnished where conditions of use demand that the bearings and cylinder openings be enclosed. Engines are supplied with extended crank shafts to meet the needs of special gearing, pulleys or clutches.

A BOOK
ON
BETTER HEATING

Issued to advertise HESS WELDED STEEL FURNACES, but containing so much general information on heating that every home owner or builder will find it highly instructive and profitable.

Its deductions are based on the experience gained in fifty consecutive years of furnace making and home heating, and numerous colleges are regularly using it as a handbook in domestic engineering classes.

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Branches at New York City; Detroit, Mich.; Minneapolis, Minn.; Milwaukee, Wis.; Cincinnati, Ohio.

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WARMING & VENTILATING CO.
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Please send to my address your new book on modern furnace heating.

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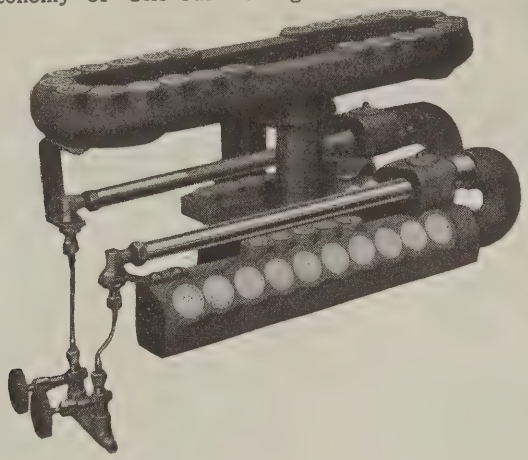
Oxo-Gas Heating Appliances

ONE of the big advantages of living in the city and one of the "modern conveniences" which make the city home desirable do not seem so unattainable to the small town or rural resident when the efficiency and economy of Oxo-Gas heating appliances, manufactured by the Gloria Light Co., 112-118 North May Street, Chicago, Ill., are known.

These appliances consist of burners to be installed in cook stoves, ranges, heating stoves, base burners, hot water heaters, bake ovens, vulcanizers, camp stoves and garage heaters. The fuel is common coal oil or kerosene. The burners are so devised as to vaporize the kerosene and form a 4%:96% mixture with air, producing a clear, blue flame which is said to be without soot, smoke or ashes. Perforated lava discs are an important feature of these burners. The burning of the gas as it passes through the discs heats them to a point near incandescence, and with the addition of refraction increases the efficiency of the kerosene oil, it is claimed, 75 per cent. The action of the lava discs is much like that of the mantel used with ordinary illuminating gas. Heat, it is stated, has no deleterious effect on the discs and they are indestructible.

The manufacturers maintain that heat produced by Oxo-Gas costs 20 per cent less than by coal, and because of the absence of soot on the heating surface a 10 per cent additional saving is effected with their equipment. The cost of operating an Oxo-Gas heater is from 1½ to 2 cents per hour.

The units comprising Oxo-Gas heating equipment consist of a burner (of different types for different purposes), a five or ten gallon oil tank equipped with a pressure gauge, a hand pump to furnish air pressure and 50 ft. of hollow wire used to conduct the kerosene to the burner. It is claimed that anyone without previous mechanical ability can install an Oxo-Gas heater outfit in less than one hour. The illustrations show a burner for an ordinary cook stove. The company manufacturers several types of burners for stoves and, in addition, a fireplace unit, a hot water outfit, oven heaters, camp stoves, garage heaters and a small range. A catalog containing complete information is supplied on request.



Above, an Oxo-Gas burner with oven heater. Note the lava discs. At right, an Oxo-Gas burner installed in any ordinary cook stove

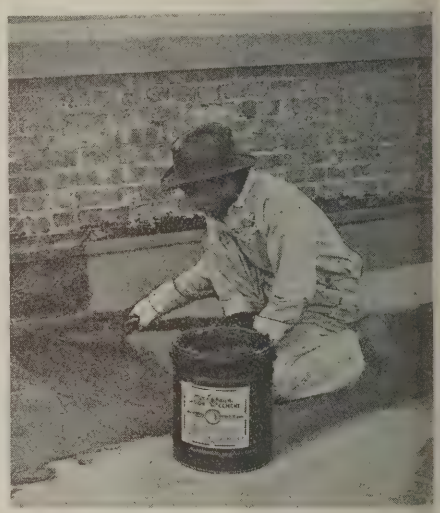
Asbestos Roof Cement Like Reinforced Concrete

STEEL bars in reinforced concrete construction relieve the strains on the concrete and distribute them over the various sections thus making reinforced concrete the most substantial and strongest type of construction. This same principle of reinforcing is taken advantage of in the making of "Black Knight" roof cement. The fibres of the asbestos, the mineral base of this cement, act like the steel bars in reinforced concrete, preventing the paint or roof cement from breaking or cracking. Since asbestos is known for its resistance to chemical influences and fire and its insulating value against heat and cold, and since the hydro-carbon, non-drying and semi-drying oils with which it is mixed and fabricated are acid, alkali and fume-proof, the manufacturers recommend Black Knight roof cement for a large variety of uses.

For instance, the point is made that this cement, unlike paint, can be applied in one coat as thick as 1/16 in. which is the equivalent of twenty of the heaviest coats of paint. Yet in this thickness, unlike thick layers of paint, it is claimed that the cement will not crack, blister or peel. Black Knight roof cement, it is stated, contains no sand, rags, felt or paper. The asbestos fibres seal all cracks, nail holes, and other leaky spots.

This cement is supplied in two consistencies, plastic and liquid. The plastic form is like putty and is usually applied with a trowel while the liquid cement is of a thick, paint-like consistency and it best applied with a long-handled three or four-knot roofing brush. The character of the work and surface determine which form to use.

Leaks in eave troughs, gutters, leaders, etc., can be economically and quickly patched with Black Knight plastic roof cement and pieces of canvas; chimneys can be flashed with it; holes in old composition roofs mended; gravel and slag roofs made watertight; corrugated iron, standing seam, V-crimp and flat rock roofs given a preservative coating; old slate and concrete roofs repaired; leaks stopped in parapets, fire walls and copings; and party walls and basements made damp-proof.

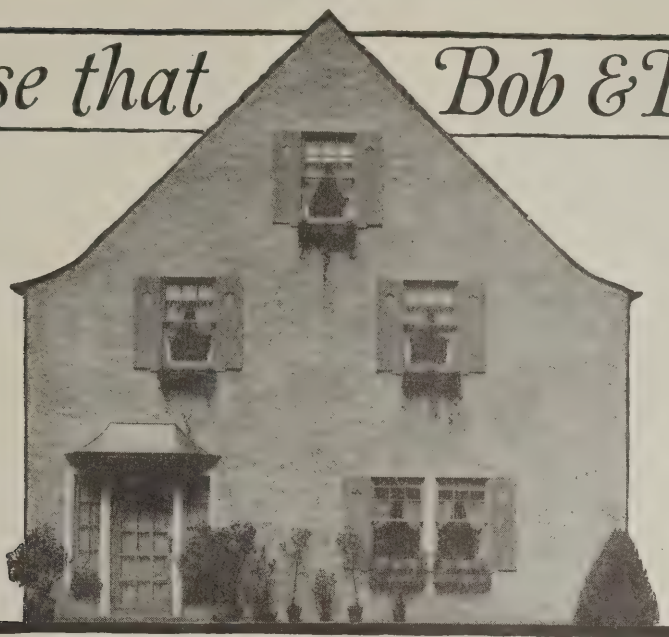


"Black Knight" plastic roof cement being used for mending a composition roof

The illustration shows the plastic cement being applied to a composition roof to make the roof and parapet wall leak-proof.

A folder with numerous other similar illustrations and with full descriptions of the uses of Black Knight roof cement is sent on request by the manufacturers, the Republic Paint and Varnish Works, 14th and Kilbourn streets, Chicago, Ill.

This House that Bob & Betty Built



and 100,000 People

MORE than 100,000 people saw the house that Bob and Betty built, the big feature of the recent "Own Your Home" show in New York.

This house was covered with stucco made from ATLAS Portland Cement with ATLAS WHITE Portland Cement for the finish coat. The visitors had an opportunity to see the beauty of the textural finish employed, the method of Portland Cement Stucco construction, and they learned that the house of concrete blocks covered with Portland Cement Stucco costs only about 2% more than the house of entire frame construction, which aroused great interest on the part of prospective home builders and will undoubtedly make many of them want their new home covered with Stucco made with ATLAS WHITE Portland Cement.

On this page is shown a front view of the house and a close-up of the textural finish employed. The variety of textural finishes that can be obtained with the use of ATLAS WHITE is limited only to the ingenuity and artistry of the architect and workman and they can with this material express their own ideas to achieve results that could not be secured with any other material.

And it is worth while remembering that the materials for Portland Cement Stucco with ATLAS WHITE for the finish coat are readily available in any section. There need be no delay in construction while waiting for materials.

Write our Technical Department for specifications or any information you may desire relative to the use of ATLAS WHITE.

THE ATLAS PORTLAND CEMENT COMPANY

CHICAGO 25 Broadway, NEW YORK BIRMINGHAM

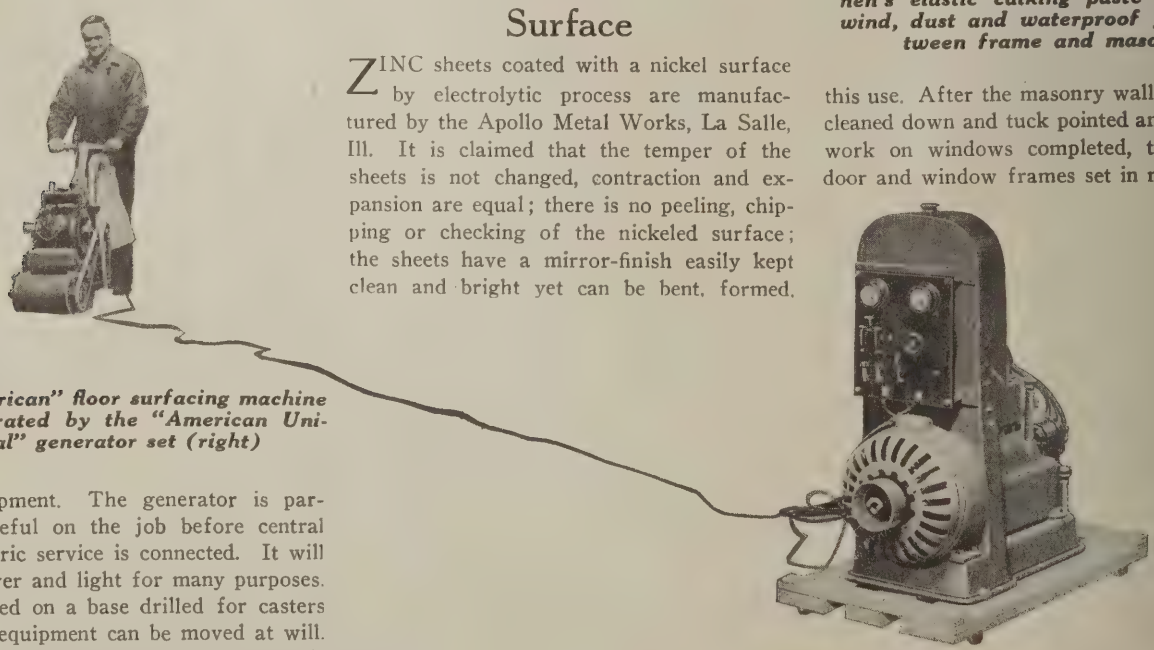
PHILADELPHIA BOSTON ST. LOUIS DES MOINES
DAYTON OMAHA BUFFALO KANSAS CITY

New Generator Supplies Electric Power on the Job

TO furnish direct power for operating its machines and other power equipment, the American Floor Surfacing Machine Co., 519 South St. Clair Street, Toledo, Ohio, has developed the "American Universal" electric generating set, a complete, self-contained unit for producing electric current on the job. This generating set consists of a four-cylinder, four-cycle automobile type engine, equipped with Bosch high-tension magneto ignition and an efficient automobile-type carburetor. The engine is directly connected to a compound wound 110-volt direct current multi-pole generator. The gasoline tank is in the base, the radiator and fan are mounted between the generator and engine, and the switchboard is mounted on the front of the radiator, making the unit completely self-contained. The generating set is supplied in two sizes, 2 kilowatt and 4 kilowatt. The gasoline engine of this generating set can be run independently of the electric generator. The engine is equipped with a belt pulley and will deliver 3 hp. at the pulley.

While designed primarily to operate the "American" floor surfacing machine, the manufacturers point out that their generating set, equipped with a belt on the pulley of the engine, can be used for driving mortising and dadoing machines, saws, lathes, joiners, presses, sanders, emery wheels and grindstones, boring machines and other power equipment. The generator is particularly useful on the job before central station electric service is connected. It will furnish power and light for many purposes. It is mounted on a base drilled for casters so that the equipment can be moved at will. The owner of a light delivery truck can, if he wishes, remove the plant from the base and mount it in his truck or trailer.

A four-page circular announcing their new equipment and describing it in detail has just been prepared by the manufacturers. It is sent on request.



The "American" floor surfacing machine being operated by the "American Universal" generator set (right)

A New Sound Deadener

BULLETIN 1S of the Union Fibre Co., Winona, Minn., announces the marketing by this concern of a new material for sound deadening purposes, which they call "Anti-Vibro-Bloc." Says the bulletin: "This is a superior material for the purposes intended, and its efficiency has been proven by six years of development and actual use.

"It is a well-known fact that mineral wool is used as a standard for an insulator against the conduction of sounds and other vibrations through materials in the physics laboratories of practically all the universities in both Europe and this country. However, mineral wool in its natural state has no tensile nor textile strength and when formed into a block or slab form for commercial purposes it must be compressed to such a density that it is really changed into a conductor of sound and vibratory energy.

"Anti-Vibro-Bloc consists of about 60 per cent, or more, mineral wool held in suspension with flax fibre blended with a chemically retro-active agent, rendered waterproof and preserving the original insulating qualities of mineral wool.

"Anti-Vibro-Bloc is now manufactured in 1-in., 1½-in., 2-in. and 3-in. thicknesses in slab form, 18 by 48 in. Anti-Vibro-Bloc is not a competitive material for sound deadening purposes where only a partial correction is necessary. It is intended to serve the architect and engineer when an insulation of high efficiency is necessary."

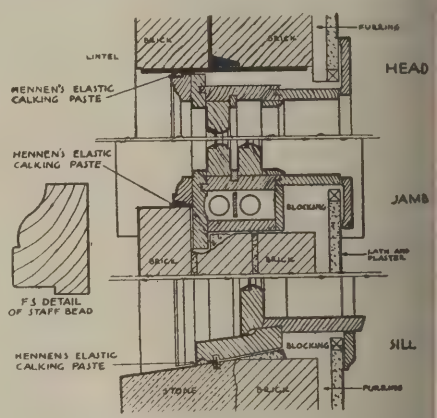
Zinc Sheets with Nickel Surface

ZINC sheets coated with a nickel surface by electrolytic process are manufactured by the Apollo Metal Works, La Salle, Ill. It is claimed that the temper of the sheets is not changed, contraction and expansion are equal; there is no peeling, chipping or checking of the nickeled surface; the sheets have a mirror-finish easily kept clean and bright yet can be bent, formed, or hammered without removing the nickel.

Apollo "Nickel Zinc," as it is called, is recommended for a wide variety of uses where a non-rusting metal surface or one not affected by alkaline solutions, sulphurous fumes and oxidization is required. It is used for covering all kinds of new or worn surfaces, such as kitchen tables, cabinets, shelves, sink backs and drain boards, counters, work boards, etc., and as trim for cabinets, chests, boxes or frames of all kinds. No. 9 gauge (0.018) is recommended for most requirements. A sheet 32x54 weighs 8 pounds.

For Calking Around Window and Door Openings

ABSOLUTELY tight joints between the walls and the frames for doors and windows is not easy to insure, but leakage of wind, dust and water through these joints is appreciably reduced if they are securely calked. The Weatherproof Calking Co., 756 Washington Avenue, N., Minneapolis, Minn., manufacture what they call Hennen's elastic calking paste, which is specially adapted to this use. After the masonry walls have been cleaned down and tuck pointed and carpenter work on windows completed, the exterior door and window frames set in masonry are sealed tight between the brick moldings and masonry sides and heads and between the wood sills and masonry sill with this paste. Wood and metal sash can also be glazed with Hennen's calking paste and it can be used for painting stone or terra cotta joints.



Detail showing plan for applying Hennen's elastic calking paste to insure wind, dust and waterproof joints between frame and masonry

The Only Journal Devoted Exclusively to the Contractor-Architect and Builder

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National Builder

July 1923

BERMICO
Sheathing Paper

Sheathing paper can be a comfort maker or a trouble maker. Bermico appeals to the home owner because of its unvarying and faithful service—through the years.

It is uniform, standard, and high quality. Is made of Canadian and New England Spruce and sized with rosin.

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NIBROC KRAFT
THE WRAPPING PAPER

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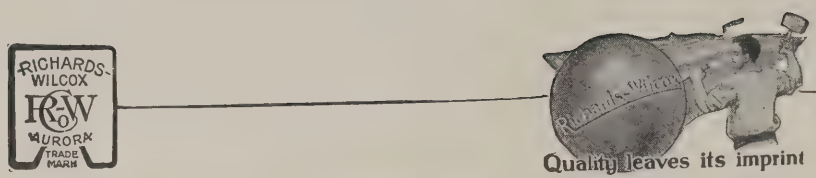
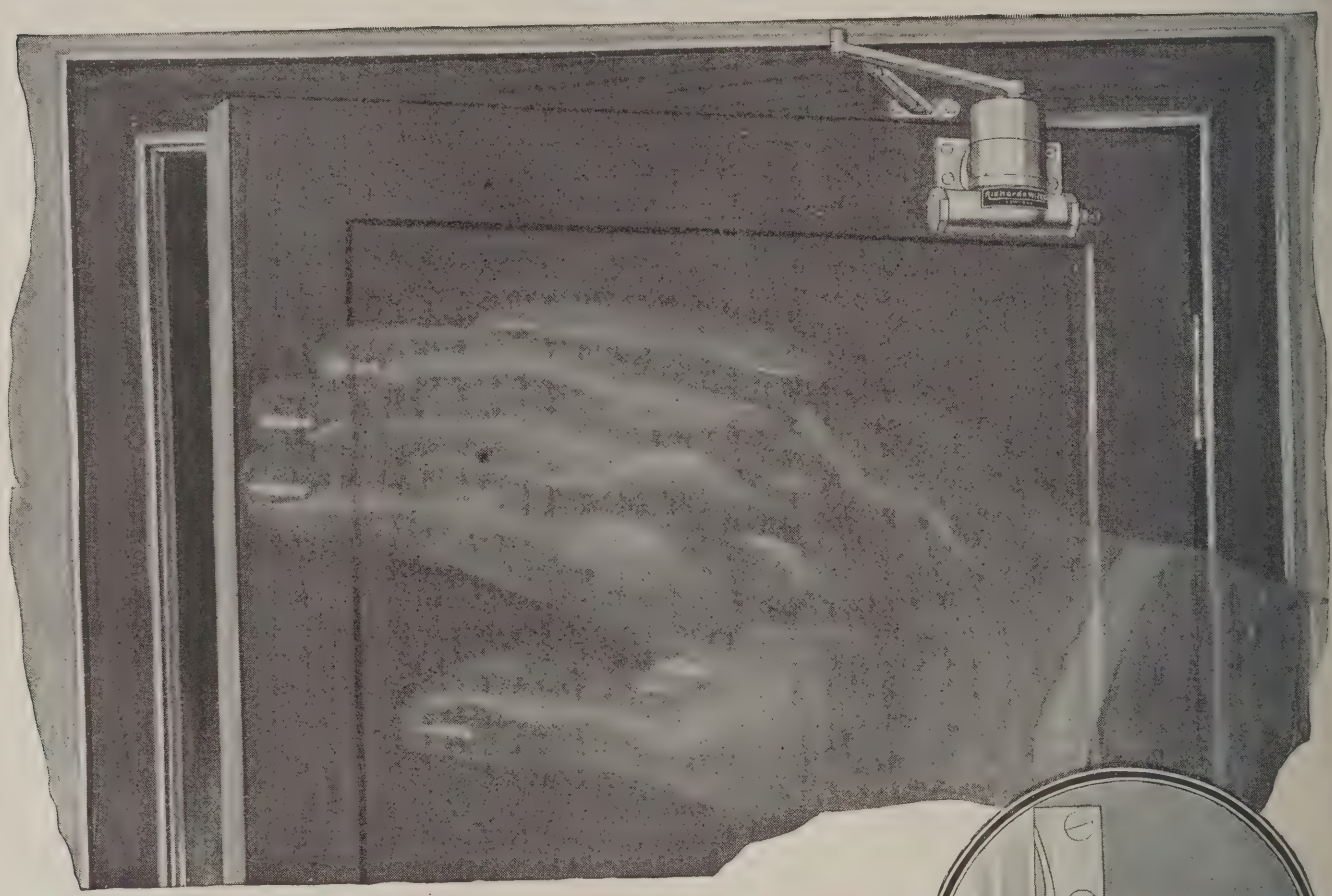
NIBROC TOWELS
ONE WIPES DRY

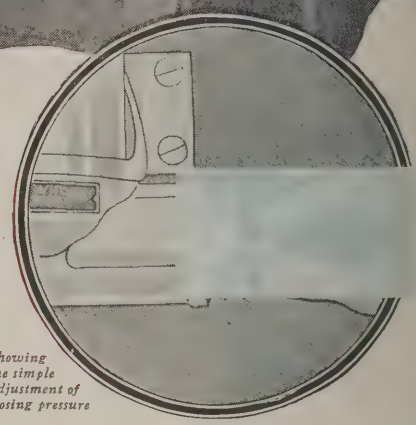
Homes and Apartments Number





Like a Phantom Hand

Swiftly, silently, completely—like a powerful phantom hand—the *R-W Door Closer and Check* shuts any door. There are six sizes, meeting every requirement from light screen doors to heavy outside doors which close against a strong draft.



Showing the simple adjustment of closing pressure

R-W Door Closer and Check

has many exceptional features that serve to exemplify its superiority. Among these are its easy adaption to either right or left hand doors by merely swinging the arm; the simple adjustment of the closing pressure by means of a single milled screw—without the aid of tools; a spring that cannot possibly be wound beyond the safety limit; the high lubricating qualities of its special liquid, and its absolutely leak-proof construction. Attachable by flush, corner or soffit brackets.

Write to Dept. H for illustrations and complete descriptions.

New York
Boston
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Richards-Wilcox Mfg. Co.

"A Hanger for any Door that Slides."

AURORA, ILLINOIS, U.S.A.

RICHARDS-WILCOX CANADIAN CO. Ltd
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Minneapolis
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Los Angeles
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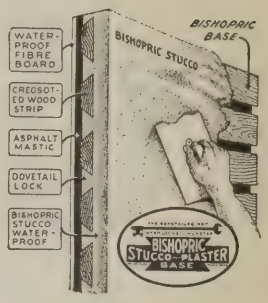
(803)

Bishopric Stucco

THE DOVETAILED KEY INTERLOCKS THE PLASTER
BISHOPRIC STUCCO AND PLASTER BASE
TRADE MARK REGISTERED

Bishopric Base

Use BISHOPRIC in your building construction.
For walls inside and outside.
Saves 25% more. Satisfaction assured.
Strength, stability, endurance.
For your client, lowest maintenance cost.



Bishopric Stucco is prepared by chemical experts at the factory, insuring uniform quality, proportion, and mixing. Chemical reactions are absolute; they do not vary.

Definite, scientific instructions govern the application of Bishopric Stucco. It is laboratory prepared to produce a fireproof, waterproof, dense, everlasting, stonelike wall.

In working with Bishopric Stucco it is only necessary to add water and proceed to mix the material to mortar consistency, ready for application on the wall.

Bishopric Stucco when ready for use provides a butterlike mixture easily, quickly, and smoothly spread. The finish coat (identical with the base coat) may be applied over the scratch coat before the latter has fully set, saving time and labor.

Bishopric *Specifications and Working Details* is a reliable guide and manual for obtaining results that will satisfy. It is furnished on application with our compliments.

Bishopric Stucco is shipped in 100-pd. air tight metal drums, providing against waste and deterioration.

Bishopric Base is this: first a fiber-board, heavy, tough, and waterproof. A thick coating of asphalt mastic is by a special process spread over this.

It is now pliable, and is proof against moisture, heat, cold, sound, and vermin. It is fire-resistant.

Into this thick layer of basic material are embedded under great pressure carefully selected wood-strips. Here are three materials made one unit—a base, to receive the plaster and stucco—*Bishopric Base.*

There is a one-half inch space between the wood-strips. In, between and around goes the Bishopric Plaster for inside walls, Bishopric Stucco on outside walls of this same BASE, locking and interlocking plaster and stucco—an inverted wedge clasp—a one-rock unit, intact today, tomorrow, more rigid year by year.

Bishopric Insulating Base has a heavy felt backing insuring sound-deadening and insulation. It makes it possible to build a home with insulation as cheaply as one without it because it displaces, eliminates, or reduces special insulations.

We have "Bishopric For All Time and Clime," a booklet for you, illustrated with photographs and floor plans of beautiful homes built of BISHOPRIC. Yours for the asking.

(Sold by Dealers Everywhere)

The Bishopric Manufacturing Company

3 Este Avenue **Cincinnati, Ohio**

New York City Office: 2848 Grand Central Terminal **Factories: Cincinnati, Ohio, and Ottawa, Canada**

National Builder

Established 1864

Entered as second-class matter April 9, 1868, at Postoffice, Chicago, Ill. Act of March 3, 1879

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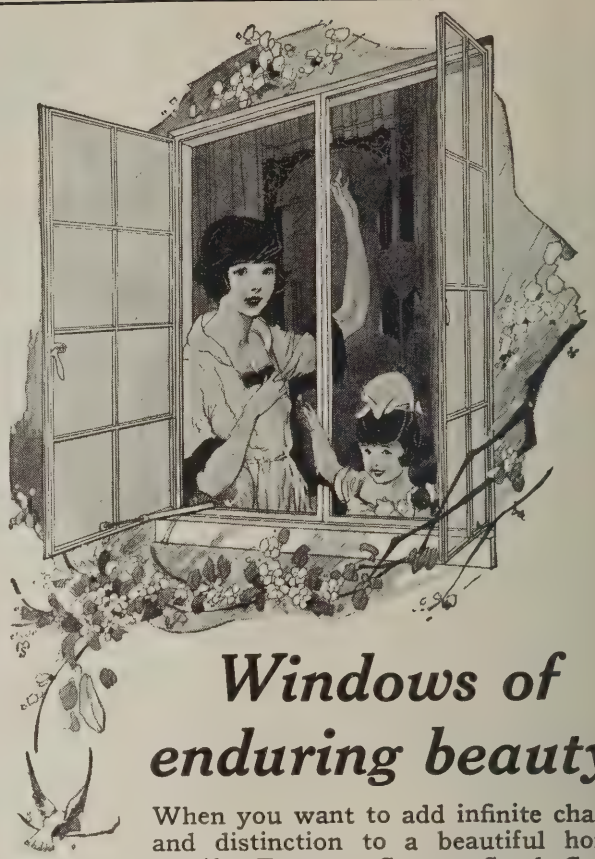

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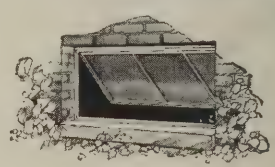

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National Builder

WOULD you like to take a peep at what NATIONAL BUILDER is going to bring you in the way of good reading and practical help in building, for the August number? We don't mind telling you a little about our next month's surprises, for we want to whet your appetite for what is coming; but we won't go too far, because that would spoil all the fun. There is pleasure in anticipation.

WELL, for one thing, NATIONAL BUILDER for August will show you pictures, plans and details of the construction of a fine, serviceable water tower, in a town in Michigan. It is the sort of water tower that you may have a chance to build some day—not in August, 1923, but a month or a year or five years from now. Keep your copy of the August NATIONAL BUILDER to refer to when the time comes that you will need it for information contained in this one article.

HOW do you like the NATIONAL BUILDER "Style Sheet" in this issue (pages 49-56)? We have tried to make it even more practical and suggestive than it has been in the past. Next month we want it to be still better. It will contain a group of attractive small houses that have been built in various parts of the country. These sepia pages should be of practical help to you in securing contracts or selling the houses you build. Show them to your customers.

NOT long ago we asked all of our readers on what subjects they would like to have articles. We were surprised at the number who asked for articles on interior decoration. Therefore, to satisfy this known demand, we went directly to one of the foremost authorities in this country, Edward Stratton Holloway, for some articles on this important subject. Mr. Holloway agreed to undertake this work for, as he expressed it, "I am glad to aid in spreading the right ideas." His article appears on pages 57 to 59 in this issue. In the August number he will have another one. Each of his articles will be complete in itself, dealing with one specific phase of interior decoration, though collectively they would compose a good sized book if bound under one cover.

A leading article in the August "National Builder" will be about this water tower

After you have read this issue, turn back to pages 72 to 75 and look at them again. The Construction Editor of NATIONAL BUILDER, who has been a successful contractor himself, has a whole lot of such good stuff like this up his sleeve and, if you like it, he will give it to you in full measure. Of course he is going to depend on you to help him do it, because it is no small job finding new methods or new uses for old methods month in and month out. He may drop in to see you one of these days. Keep on the watch for him and follow these pages. He's jumping around all over this big country of ours and getting good stuff from everywhere.

See you on August first!

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Contributions to the editorial pages will be accepted solely on their merits and paid for at the regular space rates. Contributions of timely nature must be in on the 15th of the month preceding date of issue.

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Mechanical Requirements: Type size of page, 7x10 in.; half-page, 3½x10 in. or 7x4⅞ in.; quarter-page, 3½x4⅞ in. or 7x2⅜ in.; eighth-page, 3½x2⅜ in. Screen required, 120 line; reversed plates must be stippled or Ben Day.

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A small house at 2001 West Church Avenue, Knoxville, Tenn., Barber and McMurray, architects. One of a group of five by the same designers, described on the following pages. See also page 49

A Community of Beautiful Small Houses

Five Little Homes in Knoxville, Tenn., That for Beauty of Design and Convenient Plans Are Hardly Equalled Anywhere. How This Development Originated and How the Same Thing Can Be Done in Any Community

WHAT better introduction to the "Homes and Apartments" number of NATIONAL BUILDER could be found than an account of a group of five small houses just recently built in Knoxville, Tenn.? There are beautiful houses to be found here and there almost everywhere, but it is not so easy to find five of them in a row and five which possess so many attractive features; five of which each is a little gem in itself, and yet the group is a unit of perfect harmony and delightful appearance.

Credit for this unusual development belongs to Barber & McMurray, architects, of Knoxville. Of course the owners and purchasers of these little homes also deserve credit, for had it not been for their good taste and judgment, the architects never would have been able to do what they have done in so successful a manner. There are encouraging indications of a growing appreciation on the part of the general public throughout the country, in better designed houses, and it is possible that within a few years really beautiful houses like these will be seen everywhere in large numbers instead of only occasionally and alone.

A group of five small houses on West Church avenue, Knoxville, Tenn. Barber and McMurray, architects. Note the fine proportions and beautiful details of each house and the harmony in the group as a whole. Only common materials have been used, i. e., stucco, brick and shingles. The houses are built on a sloping street and are skillfully placed on the site.

It is indeed true that it is not often that architects of standing have an opportunity to design and plan really small houses; that is, houses of less than eight or ten rooms. This is because the architect's fee for planning and designing a small house, based on a percentage of the cost of the building, is not enough, as a rule, to attract him to the small-house field. As a result, many of our small houses are without any real architectural merit. These houses in Knoxville are really quite small, yet they are in every way the equal in beauty of the largest country homes, and far surpass the appearance of the average large residence. Nor has the beauty of these houses been attained at the expense of comfort or convenience in the room layouts, as the two plans on this page and page 49 show.

It is a common sight in our larger cities, and more and more in the smaller ones, to see row on row of houses or bungalows which are identical in general design, plan and setting. There is nothing that should be avoided so much as this sort of building. The average city "bungalow," with its face brick front and common brick sides, or its drab pebble dash stucco finish, is something that can be easily dispensed with and beautiful little groups like this one at Knoxville

A house representative of the group. Its plan and interior views are shown on the opposite page. The chimney is an attractive feature of the front elevation

built instead, at very little or no greater expense, and with far more pleasing results.

It is admitted by everyone that a good house needs a good setting to display it to best advantage. That is why it is always desirable, when possible, to build a number of houses of the same or similar architectural types in one group, so that the attractiveness of one will enhance that of all the others. These Knoxville houses suggest how this sort of thing might be done everywhere, for it is interesting to note that all of these houses were not built at one time, nor by the same contractor. Two of them were put up at first under the supervision of Barber & McMurray. The success of these first two and the appeal that they made to people of good taste in Knoxville resulted in the building of three more, shortly afterward, and it was only natural that the builders of the last three houses should seek the assistance of the architects who were responsible for the first two. Thus it is that the builder who does something worth while, and sets the pace for his community, invariably enjoys increased business. No other man's good work so quickly recommends itself to prospective customers as that of the successful builder. One good job always earns another.

These Knoxville houses are an interesting study in design. They comprise houses of two architectural types, English and Colonial. In these two expressions variety is attained without the sacrifice of harmony in the group. Only common materials have been used in the construction. Two are of stucco, two have shingled walls, and one is of brick. The two stucco houses and the one brick house employ some shingles for trimming the walls in such a manner that each house is knitted into the group and made to harmonize with all the others. Note, for example, reading from left to right in the picture of the group on page 23, the first is of English type, in stucco; the second is a gambrel roof of Colonial design. The two are sufficiently alike in their details—the slight overhang of the roofs, principally—to make them look well side by side, but the stucco house has a bit of wood shingle trim in its gable peaks, which relates it directly to the shingle-covered Colonial cottage. Likewise with the third house on the street. Although built of brick, its gables are shingled, and so it harmonizes with the two shingled neighboring houses. A color harmony but not sameness is similarly obtained in the roofs of the five designs and a colorful chimney, with an interesting pot or two, is a characteristic feature of each exterior. Note also the small louvre in each gable. It is an effective architectural detail and at the same time the louvres serve a useful purpose because they allow ventilation of the attics, keeping the upstairs cooler in hot weather.

Detail of front entrance and door, showing seats on the sides

There is an absence of ornament on these houses. A wide strap hinge, an entrance lantern, an arched doorway, a bit of lattice work or an entrance settle are all that are necessary to relieve the plain simplicity of the walls and add interest to the exteriors. Of course, divided light windows are used throughout, and they are in themselves attractive details, giving interest to the openings and preserving the scale of the buildings. A nice variety has been obtained in the use of both casement sash and double

A scene in the living room of the house illustrated on the preceding page

A view of the larger bedroom showing treatment of the "cut" ceiling and interior appearance of the dormer

hung windows, and the blinds on the windows of the little gambrel roof house are thoroughly in keeping with its Colonial design. The architects have handled the dormers in a very successful manner, keeping them small in their details and in relation to the houses of which they are a part.

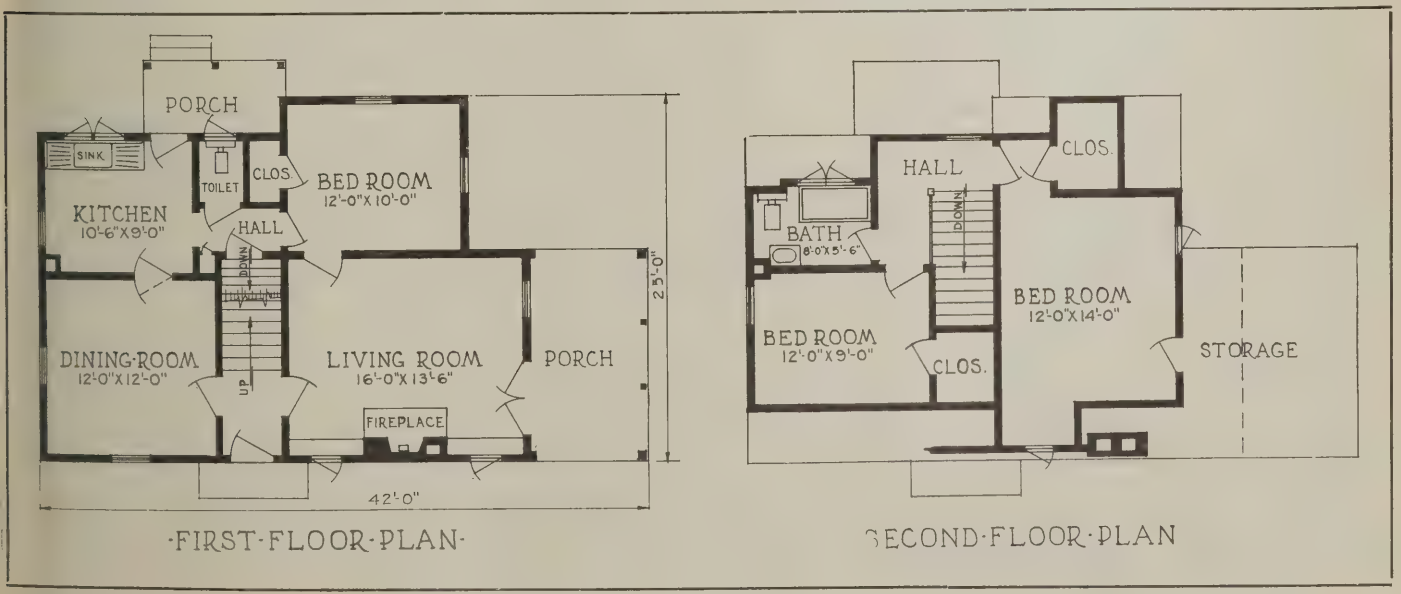
Another noteworthy characteristic of this group is the site on which the houses are built. The lots slope in the direction that the street runs. Consequently each lot has been terraced and each house stands on a separate level. Instead of spoiling the effect, this fact seems to add to the attractiveness of every house, as well as to all of them as a whole.

The interiors are as thoroughly in keeping with the architectural styles of the houses as it was possible to make them from a selection of materials locally available. Simplicity is the keynote in the backgrounds—the walls, ceilings and floors—and it is apparent from the photographs that the owners of the houses have furnished them in tasteful manner appropriate to the scale and style of the houses. A beautiful home is an incentive to every housewife to furnish and decorate beautifully, and what she does to it always reflects to the architect's or builder's credit, for her work sets off the house to advantage, just as the house enhances the furnishings.

Photographs of the exterior and interior of one of the houses, together with a sketch of its floor plans, are reproduced here, as representative of the group. These pictures and plans are deserving of careful study and such study will, undoubtedly, suggest to many readers the possibilities of encouraging such building developments in their own communities. These houses can be built and sold at such low figures that a development of this kind ought ot succeed anywhere.

The Building Business Is Not All Construction

NOT long ago when the term contractor or builder was mentioned, the average person thought of a man who knew all about the use of saws and hammers and concrete and iron and that was about all. Today that definition by no means tells the story. What a contractor and builder has to and ought to know has no limits. He must be thoroughly familiar not only with design and construction, but he must know business methods, finance, salesmanship and, above all, human nature. The truth of this statement is emphasized by the recent death of a contractor and builder, which was really caused by worry. He broke down under the responsibilities that weighed on him as a result of some errors in judgment he had made.



No sacrifice of comfort and convenience on the inside has been made for the sake of an attractive exterior, for the floor plan of house illustrated on the preceding page is carefully laid out and economically arranged. An unusual feature is the downstairs bedroom with adjacent toilet.

Apartments of All Sizes in an Attractive Building

Thirty-Six Apartments from Three to Six Rooms Each in a Three-Story Building of Colonial Design with English Basement. A Building Built for Investment Rather Than Speculation by the Architects, Who Were the Original Owners

AN apartment building that successfully combines many advantageous features is found in the Hinman & Lee apartment building which has recently been constructed on the northwest corner at the intersection of Hinman avenue and Lee street in Evanston, Ill. This building was designed and planned by L. G. Hallberg & Co., architects, Chicago, Ill., who were the original owners, the apartment building having been built for investment. Sundstrom & Carlson were the carpenter contractors, and F. O. Johnson, the mason contractor.

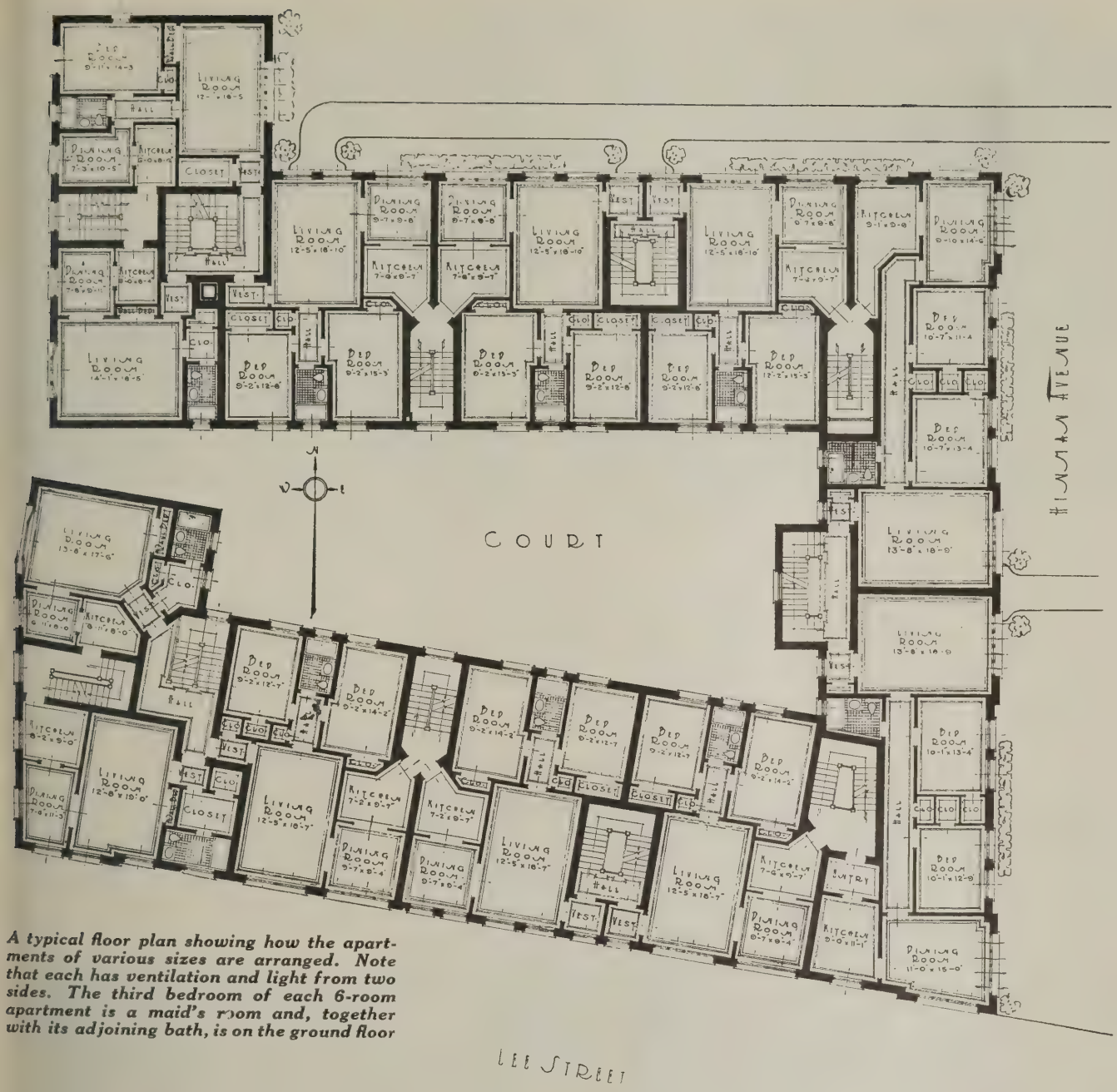
The building is three-story with a full English basement. The first story is built of reinforced concrete, permitting fireproof construction. The walls of the first floor and the sills and cornices are of Bedford limestone. The same stone, some carved and some plain, are used to trim the upper walls, which are of tapestry brick of variegated texture. The building possesses a distinctly Colonial feeling which is carried out by divided lights used in the windows and doors, the muntins preserving the scale of the design and preventing the openings from appearing like big black holes in the walls, as so many windows and doors do.

A typical floor plan is reproduced. The building is divided into 36 apartments; nine of which contain three rooms; three, four rooms; 18, five rooms, and six, six rooms. The third bedroom of each six-room apartment is the maid's room and together with its adjoining bath is on the ground floor. Thus the building contains a sufficiently wide variety of accommodations to suit families of varying sizes and incomes. Consequently, it is a building that can be maintained profitably in a comparatively small city, as well as in any section of a large city. A very good public restaurant on the ground floor, only one or two steps below the street level, where it is light and airy, is handy for the tenants on occasions when they wish to take their meals out.

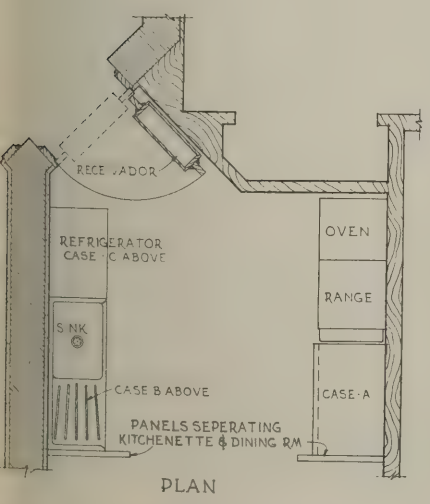
All the apartments have hardwood floors and trim throughout except in the bathrooms, which have tile floors and walls, full recess tubs and built-in bath fixtures. The walls of the living rooms and dining rooms are canvassed, enameled and paneled and the rest of the walls are papered, except in the kitchens, where they are painted white. All the doors are of brown mahogany and the trim white enamel.

Special attention has been given to the equipment of each kitchen, so as to increase the usability of every inch of space without making the room cramped and

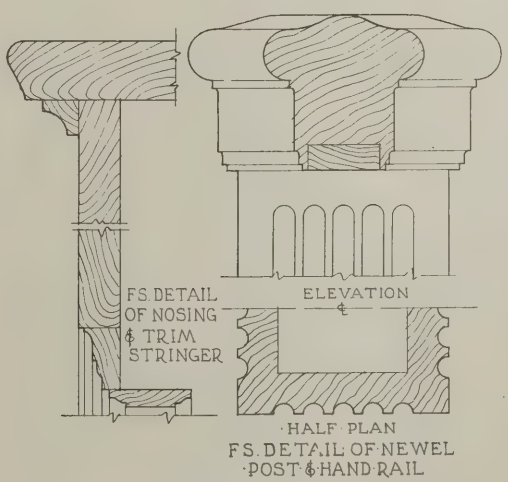
The Hinman and Lee apartment building in Evanston, Ill. L. G. Hallberg & Co., architects and original owners; Sundstrom & Carlson, carpenter-contractors, and F. O. Johnson, mason contractor. The first story is constructed of reinforced concrete, making it fireproof, with the walls up to the first floor and the sills and cornice of Bedford limestone, which is also used to trim the upper walls of tapestry brick of variegated texture

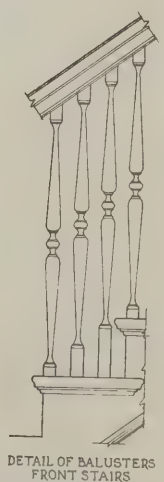


A typical floor plan showing how the apartments of various sizes are arranged. Note that each has ventilation and light from two sides. The third bedroom of each 6-room apartment is a maid's room and, together with its adjoining bath, is on the ground floor



Plan of a typical kitchen layout. Note the paneled partitions between the kitchenette and dining room





Detail of stair parts showing design of fluted newels, the handrail, nosing and stringer and the turned balusters. Stairways of this design for the building cost about $2000 more than stock square posts and balusters would have cost

One of the living rooms, showing the mirror doors that conceal the closet bed, and the French paneling used throughout the interior

One of the vestibules and stairs. Note the red quarry tile floor and the paneled wainscoting. The stair carpet was furnished as a part of the building

inconvenient to work in. The kitchen of each three- and four-room apartment is furnished with a "Cabranette," a patented kitchen cabinet built of enameled steel and porcelained iron, in combination with a sink, a stove and an icebox with ample cabinet space. In all the other apartments, the kitchens each have two white enameled wood cabinets.

Another kitchen convenience is a "Receivador." This is a patented device built into an ordinary sash door. It consists of two cabinets enclosed by doors on both sides, making them accessible from both within and without. The milk man, for example, presses a button, the door of one cabinet flies open; he leaves the milk and other items called for and then closes the door, which cannot be opened again from the outside until the inside door is opened and the goods taken in. Two such cabinets are provided in the event that the housewife expects more than one delivery of supplies during her absence or when she is not in attendance on the kitchen.

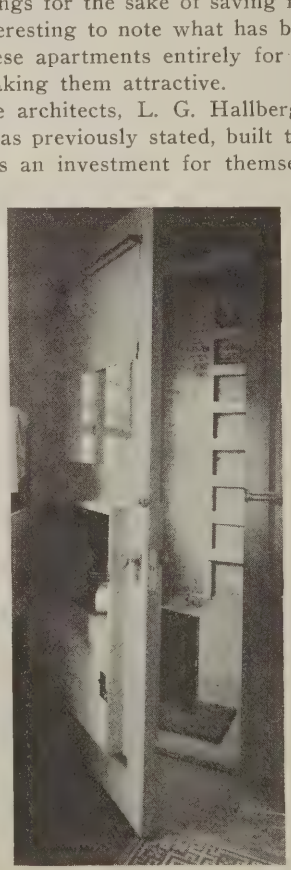
The laundries in the basement are large, light, roomy and airy and are supplied with the latest facilities. The heating plant consists of two Kewanee downdraft portable boilers furnishing steam heat through the Illinois Engineering Co.'s vacuum system.

French paneling is employed as a basis of the decorative scheme throughout the interior of the apartments. This paneling consists of the walls being marked off into rectangles by means of a small molding applied directly to the plaster. The stairways and halls are carpeted, and the hall doors, in addition to having attractive knobs, are also equipped with small nickeled knockers of a design in keeping with the Colonial style of the building.

The lighting fixtures are tastefuly selected and add an interesting color note to the walls. Murphy "In-a-door" beds are used in many of the apartments. They are enclosed behind mirror doors which add much to the brightness of the rooms and by their reflections increase the apparent size of the rooms.

Today, when the builder who builds to sell is often accused of cheapening his construction and sacrificing the beauty of his buildings for the sake of saving money, it is interesting to note what has been done in these apartments entirely for the sake of making them attractive.

The architects, L. G. Hallberg & Co., who, as previously stated, built the building as an investment for themselves, designed a specially detailed stairway consisting of fluted newels and turned balusters, which in all, cost about $2000 more than the ordinary square balusters and newels would have cost. By a comparison of the stairway illustrated with what it might have looked like had cheaper forms been used, it is plain to see that the more attractive stairway gives a beauty to the halls that the prospective tenant will be glad to pay for in the form of a slightly increased rental. The entire building, as a matter of fact, is a credit to the designers and shows that architects practice what they preach when they are their own clients.



The "Receivador" in the kitchen, with doors open, is a package receiver

Paneled partitions separate the kitchenettes from the dining rooms. Note the "Cabranette" used in the 3 and 4-room apartments

Store Front Construction

II. Plans—A Discussion of Various Layouts

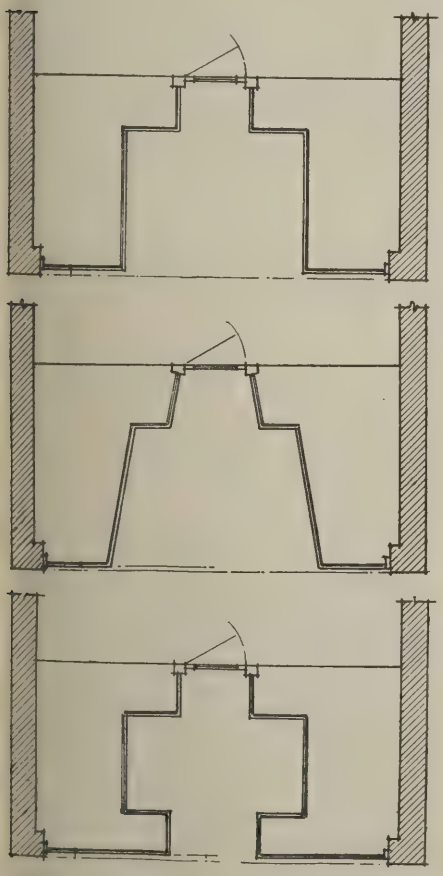
By Roy M. Singer
Construction Editor, National Builder

AS indicated in the first article, store front plans are subject to wide variation, ranging in design from the simple center entrance type with a shallow show window to the arcade or island front style which may be laid out with one or more show cases with glass on four sides, called islands. This great variation is governed by the merchandising of different materials. It is better to fit the store front to the business rather than to select arbitrarily a layout and attempt to overcome the mistakes in planning by elaborate displays.

When it is not expected that the tenant will remain for a period equal to the life of a store front, an average type front, such as is shown on this page, is better suited to a variety of uses than any other kind. This front is simple of construction and plan and the cost is less than a more complicated type involving more glass. The bulkhead should be medium height so that if necessary both small and large objects may properly be displayed. This design, however, is best suited to the showing of smaller wares such as drugs, jewelry, clothing, haberdashery, shoes, millinery, hardware, etc. To the left of the photograph are illustrated three variations in lay-out of this design to provide for the display of different objects, or in case several departments are to be given display space. These fronts should seldom be made more than 20 ft. wide.

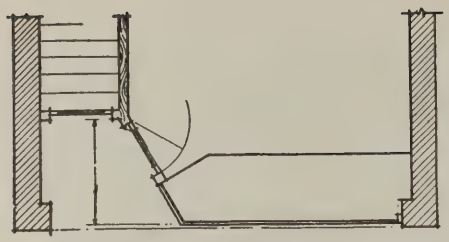
Structural requirements and the location of the site also often make certain changes necessary. For instance, automobile display rooms require a wide front entrance through which cars may be driven; corner stores may be designed in several fashions and then there is the problem of the narrow front, and the case where a second floor entrance is required and cannot be avoided.

The design of the second floor entrance front is quite a problem inasmuch as the space required for the upstairs entrance must be taken from the display frontage. It is necessary to develop a plan whereby the second floor entrance doorway must be made as inconspicuous as possible. In the designs which illustrate this type of front, two methods of obtaining the maximum amount of display frontage and of making the windows, rather than the upstairs entrance the main part of the design, are shown. The first plan shown illustrates a second floor entrance front with the store entrance and the upstairs entrance together. The other design provides for a separation of the two entrances but has a disadvantage in that the width of the display frontage must necessarily be reduced to allow for two entrances.



Three variations in plan of the simple store front shown at the right. These designs permit a subdivision of show-window space for the display of various items

A simple store front with high bulkhead for displaying small objects



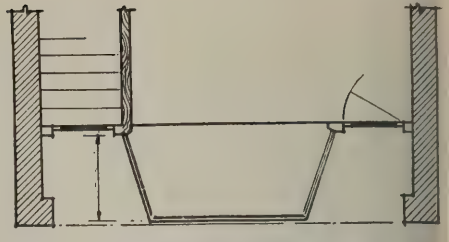
Store front with store entrance and second floor entrance together

Another type of store front, which is worthy of discussion, is the front designed for an extremely narrow store, which does not run more than about 15 ft. in width. Such stores are generally used as shoe-shining and hat-cleaning shops or for the sale of small articles and therefore the fronts are designed with high bulkheads.

The problem in connection with this type of front is arranging the plan so that the maximum amount of display frontage may be obtained without making the doorway too narrow. Double show windows are hardly to be recommended. The best layouts for a narrow front are for single show windows, and two designs are shown at the bottom of this page. In order to provide a large entrance way, the angle which the two panes of glass make with each other should be greater than 90 deg., but if a narrow entrance is not considered a disadvantage, the maximum amount of display space will be obtained by using a 90-deg. angle.

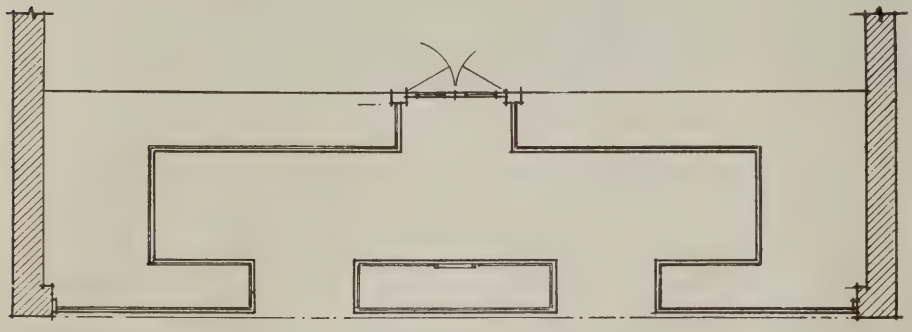
Large articles such as furniture, stoves, clothing displayed on models, etc., require wide show windows with low bulkheads. The plan for such a window is also shown at the bottom of this page.

Where the street frontage runs greater than 40 ft., a design which is increasing in popularity is the so-called arcade or island front. This type of front provides a large display area and by means of the isolated show-cases permits the display of special sale items or such materials as are desired to be especially brought to the attention of the prospective customer. These arcade fronts afford plenty of opportunity for the window gazer to roam around and examine the display, undisturbed by people passing by on the sidewalk.

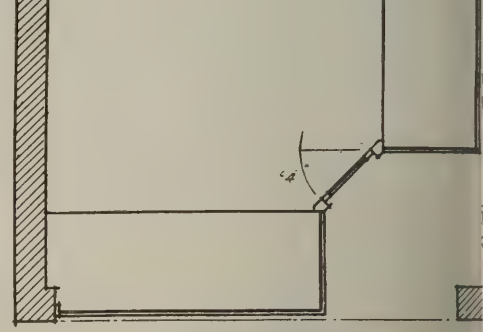


Store front with store entrance and second floor entrance separated

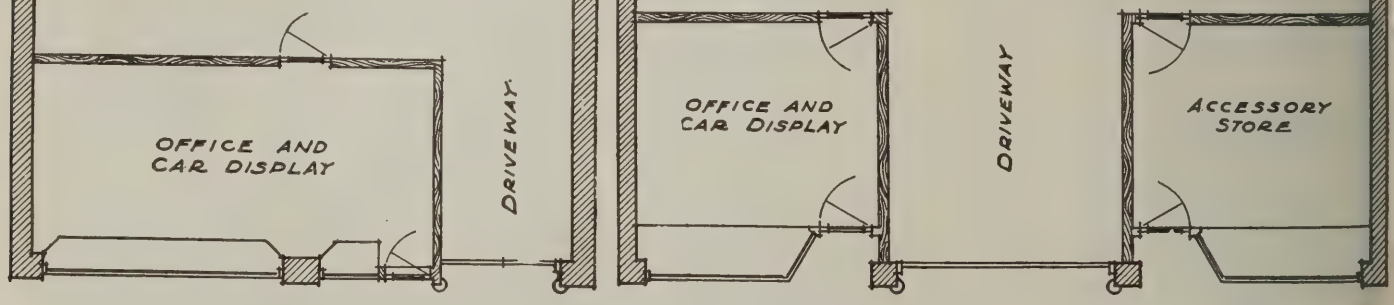
These arcade plans may be of several different types and they may be arranged with one or two entrances to the store proper and with one or more island show cases of varying dimensions. They afford opportunities for the separation of various displays, due to the ease with which they may be subdivided.



Arcade front with island showcase



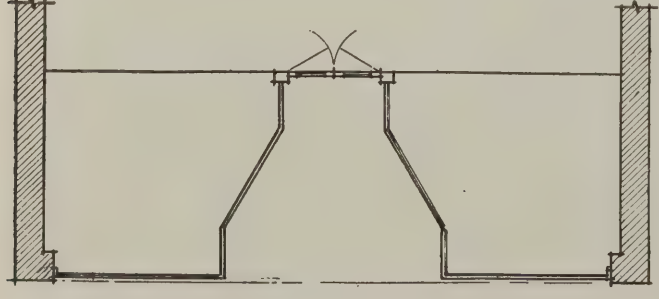
Corner store front



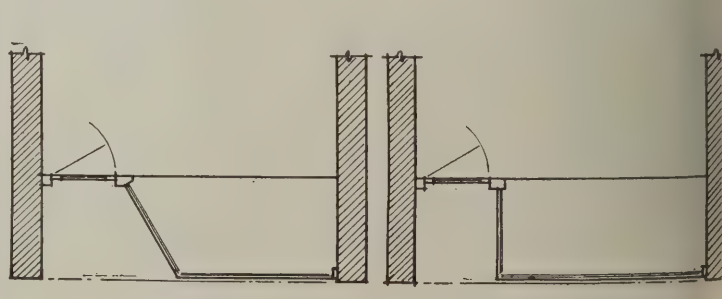
Garage front with display windows given preference over car entrance

Garage front with entrance given preference over display frontage

It must always be remembered that the object of a good store front plan is not only to draw people to the front but also to hold them before the show window and to lead them into the store.



Wide store front for the display of large articles



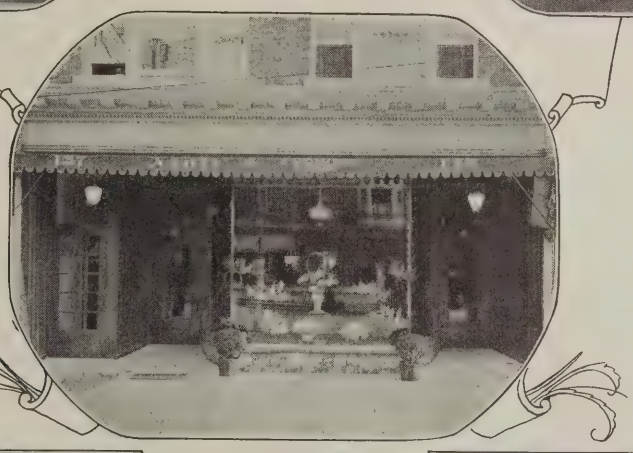
Narrow show windows for the display of small articles

Types of Store Front Layouts

Inside of an arcade front

A narrow front with high bulkhead

A corner front for the display of large articles



An upstairs-entrance front with store entrances and upstairs entrance separated

Typical exterior of an arcade front

A corner front with door at show-window intersections

The Ironing Board as a Structural Unit

By Mrs. Agnes B. Kirby

THE successful builder, in these days of compact building, plans his houses not only with an eye to superior construction to appeal to the man of the house, but he also includes everything possible for the convenience of the housewife. A badly arranged kitchen may be the cause of a house remaining unsold, even though it may have beauty of design in other respects and be of the best construction.

One convenience that has been added by a great many contractors and builders who believe in appealing to the housewife is a built-in ironing board. The old-fashioned folding type has long been an eyesore. It is unsightly and is always in the way. The unfolding and folding again consume a great deal of time as well as cause annoyance and heavy lifting. The cabinet ironing board is concealed, it utilizes waste space, is never in the way, can be prepared in an instant and put away just as quickly.

This built-in convenience costs very little, but it adds real dollars to the value of the house. The builder who includes one in his plans is adding an item that is inexpensive to him and one that many times will make him a sale simply through its strong appeal to the housewife.

There are several types of these ironing boards that fit into the wall. That shown in Fig. 1 can be adjusted to four different heights. At the lowest adjustment the board stands 2 ft. 9 in. from the floor and at the highest, 3 ft. 2 in.

Fig. 1—A built-in ironing board that is adjustable in height

Fig. 2 shows a double board, a smaller one for sleeves. It can be folded out of the way of the big board when not in use. There are no legs resting on the floor, as both boards are supported by steel braces.

The board in Fig. 3 also has a sleeve board which drops down over the large board. A socket for the iron on the inside of the cabinet and a metal holder for the hot iron make this board unusually serviceable. Below the board is a space which may be used either for storing the iron, or can be fitted with a seat, which folds into the cabinet when not in use. (Fig. 4.)

When the kitchen is of necessity small and every bit of space must be utilized, the ironing board in Fig. 6 could be used to advantage. There are three shelves above the space occupied by the ironing board when it is not in use, on which the iron and cord, and laundry supplies may be stored. Another point in favor of this particular board is that it folds down instead of up, thus making it impossible for the board to fall out.

There is another type of cabinet ironing board which has been designed especially for installation in houses already built. (Fig. 5). The baseboard is cut to the desired width and the cabinet is nailed or screwed to the wall as securely as though it were built there.

(The names of the manufacturers making the ironing boards illustrated here will be sent on request.—The Editor.)

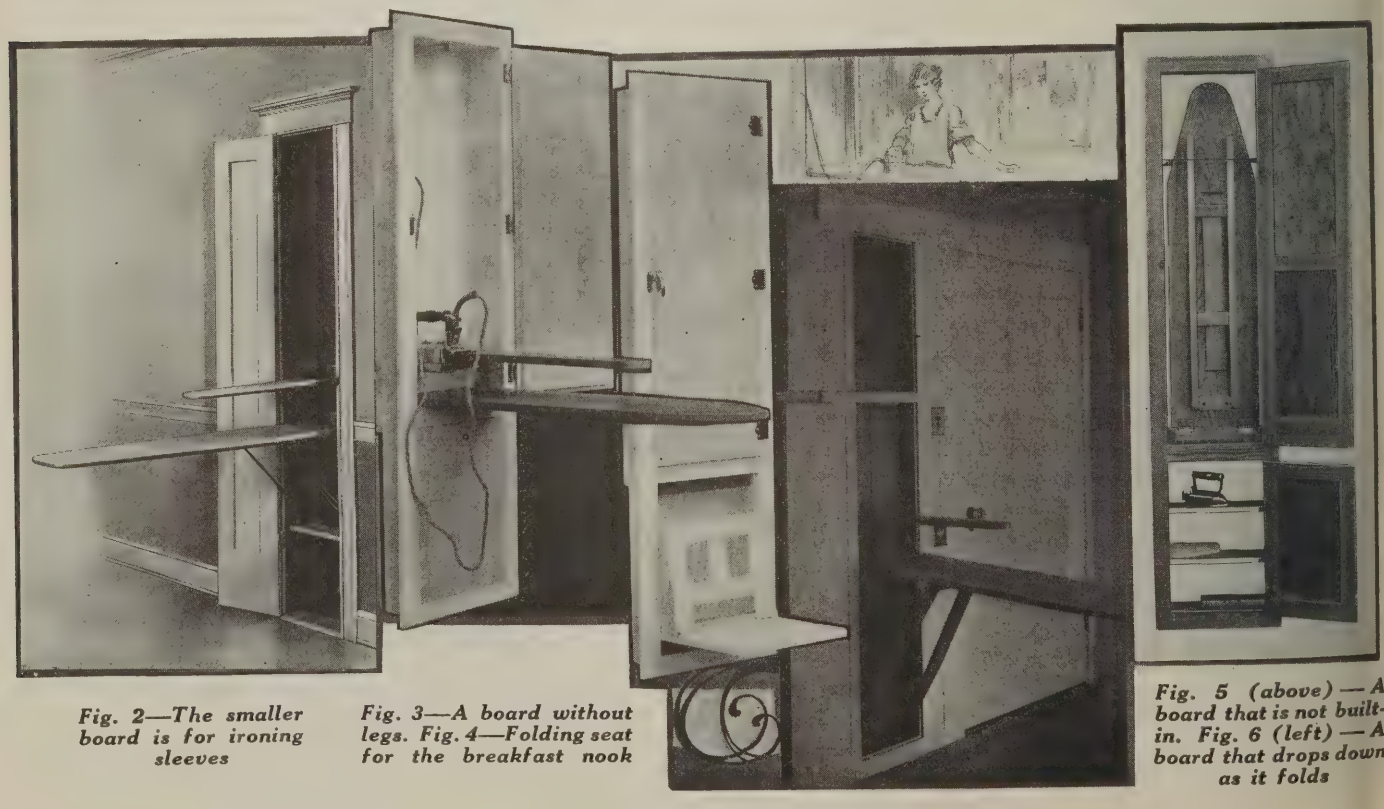


Fig. 2—The smaller board is for ironing sleeves

Fig. 3—A board without legs. Fig. 4—Folding seat for the breakfast nook

Fig. 5 (above)—A board that is not built-in. Fig. 6 (left)—A board that drops down as it folds

A Group of Three Houses

Planned and Designed Especially for NATIONAL BUILDER *by The Architects' Small House Service Bureau of The United States, Inc.*

U.S.A. ARCHITECTS' SMALL HOUSE SERVICE BUREAU INC.

TRADE MARK

"I ONLY build a dozen or fifteen residences a year but all that I do is for the home owner himself. I have started work on the plan, No. 5A50, in the January issue. I am building it out of frame, however. This home will be owned and occupied by a young doctor and his wife. I could not well get along without *National Builder* and continue building up-to-date residences."

This is part of a letter received by *National Builder* from a subscriber in Kansas City, Kans., Mr. H. L. Oldfather. It is published not because of its compliment to this journal but because of the suggestion it contains for other contractors and builders to make equally profitable use of the architectural service which *National Builder* is publishing with the co-operation of The Architects' Small House Service Bureau of the United States, Inc.

There are some exceptionally attractive designs and thoughtfully worked out plans in the group of houses published this month. Two of them are six rooms in size, while the third is a little four-room layout with desirable features. One of the houses is designed for stucco, one for frame construction, and the third utilizes the justly famous "ideal" brick wall. Of course any of these designs will look well in almost any other material than that called for by the plans, if such other material is preferred for any reason.

Study the following pages carefully and then file this issue away where you can easily get at it for showing to your customers. Therein lies the greatest value of these pages.

Remember that complete blue print plans for these houses are furnished at half price to *National Builder* subscribers.

Below is an explanation of the material and wiring symbols and miscellaneous data pertaining to plans on the following pages

MATERIALS		ELECTRIC WIRING SYMBOLS			
CONCRETE		CEILING OUTLET		3 WAY SWITCH	
BRICK		DROP CORD		GAS OUTLET	
WOOD		BRACKET		PUSH BUTTON	
PLASTER		BASE PLUG		BELL OUTLET	
TILE		SWITCH		BUZZER	

Dimensions are taken to outside of foundation walls, to outside of studs on exterior walls and center of studs for partitions.

Foundation walls shown concrete may be stone, brick, concrete block, or load-bearing hollow tile.

Where building ordinances permit, foundation walls may be 9 in. thick (with 20x9-in. footings), except in case of stone, which shall be 18 in. thick.

Stock numbers refer to moldings in Universal Millwork Design Book No. 20. In case these moldings cannot be procured, others of similar design and size may be substituted.

Provide 1⅛-in. screen and storm sash for all exterior openings, except ice door, unless otherwise noted. Bottom rail of storm sash to have vent.

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Six-Rooms with Half-Timber and Stucco

House No. 5A58, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.

ONE of the finest plans in this series of small house designs is House No. 5A58, shown here, which is a successful combination of the practical and artistic.

It follows in design the beautiful English domestic style of architecture, with half timber in the gable ends. The construction is exterior finish of stucco on metal lath, cement base course, brick steps to entrance and casement windows to carry out the English spirit. It is especially designed for a 50-ft. lot, but if turned with narrow end to the street can be accommodated on a 35-ft. lot. The working drawings supply an alternate entrance detail to be used when the narrow side is turned toward the street. Here is another design that would build well on a corner lot. The large enclosed porch is an especially desirable feature.

This house is designed to face south or east. Reversed plans for other facings are supplied to NATIONAL BUILDER subscribers without extra charge.

Examination of the floor plans, elevation and details show the many features of this house. It belongs to the economical and popular center stairway type. The living room occupies one entire end, receiving light, air and sunshine from three sides. Dining room and kitchen share the other half of the first floor. The kitchen is a model of convenience with an unpartitioned breakfast nook. The dining room has cross-corner ventilation and light.

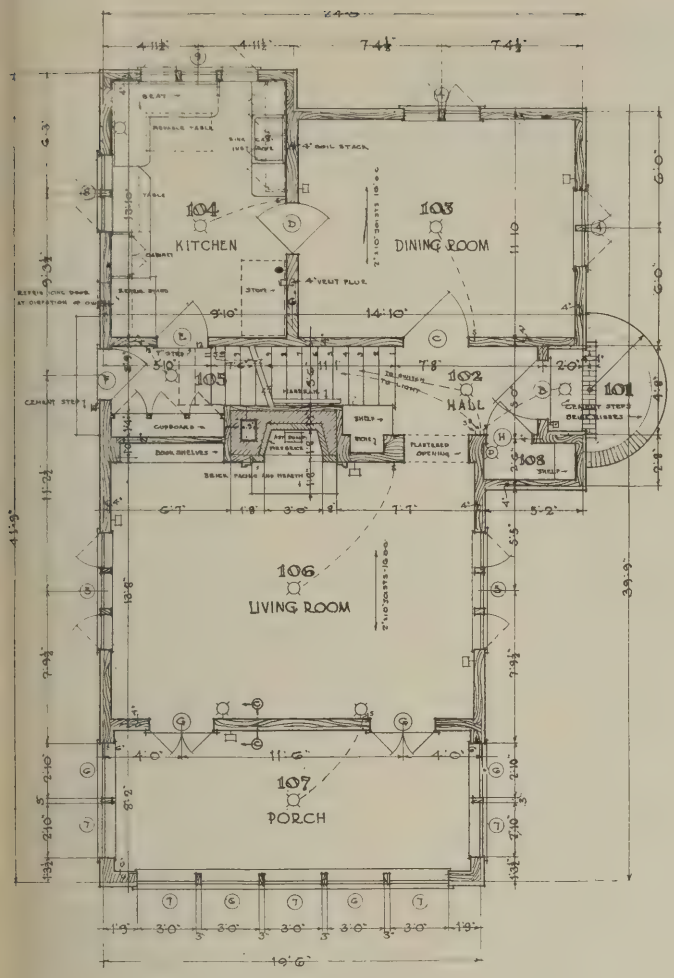
In the front hall there is a large coat closet and beside the stairs a convenient niche for a telephone and heat outlet.

The living room is an unusually lovely room with its fireplace, high book shelves, two triple windows and the French doors leading to the porch.

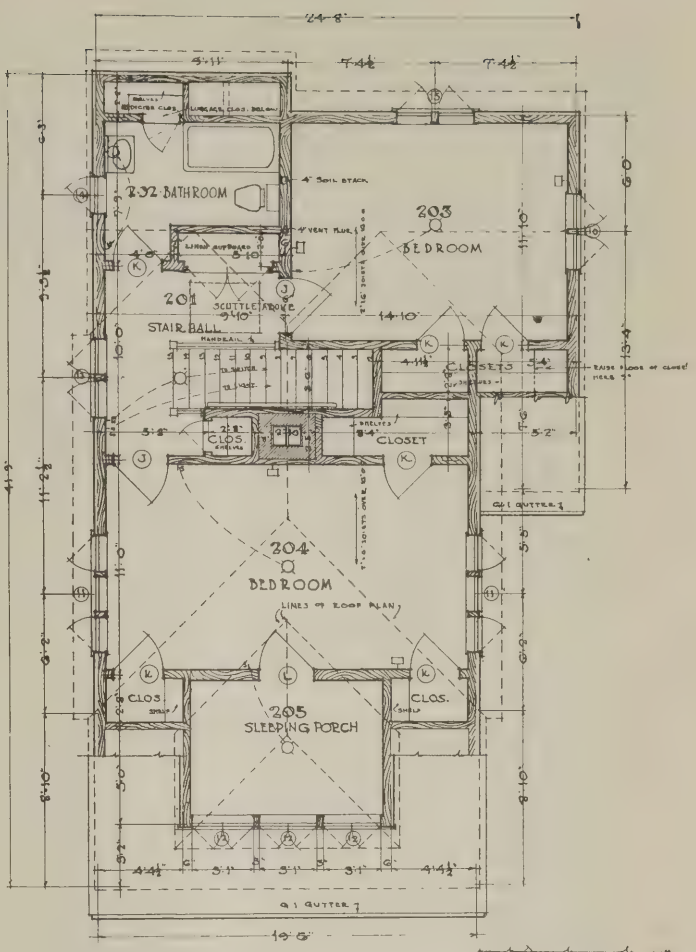
On the second floor there are two fine bedrooms, both with ventilation from two sides, a bath and sleeping porch that can take three single beds.

There is room for an attic and the plans call for a basement with large light laundry and storage rooms if desired.

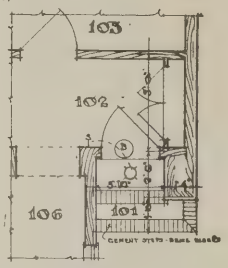
The regular price of this plan is $25 ($13 to NATIONAL BUILDER subscribers).



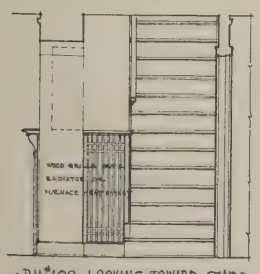
FIRST FLOOR PLAN
SCALE ¼" = 1'-0"



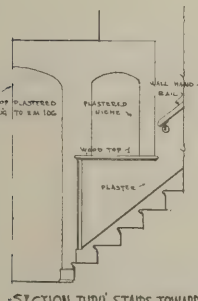
SECOND FLOOR PLAN
SCALE ¼" = 1'-0"



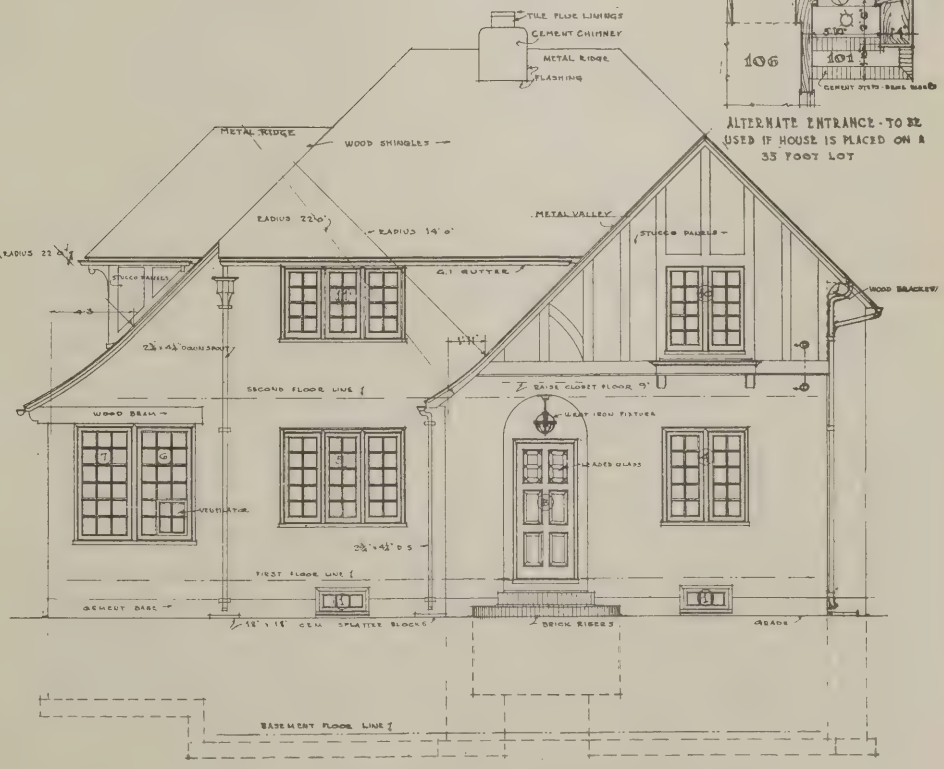
ALTERNATE ENTRANCE - TO BE USED IF HOUSE IS PLACED ON A 35 FOOT LOT



RM "102 LOOKING TOWARD STAIRS"



"SECTION THRU' STAIRS TOWARD "106"



FRONT ELEVATION
SCALE ¼" = 1'-0"

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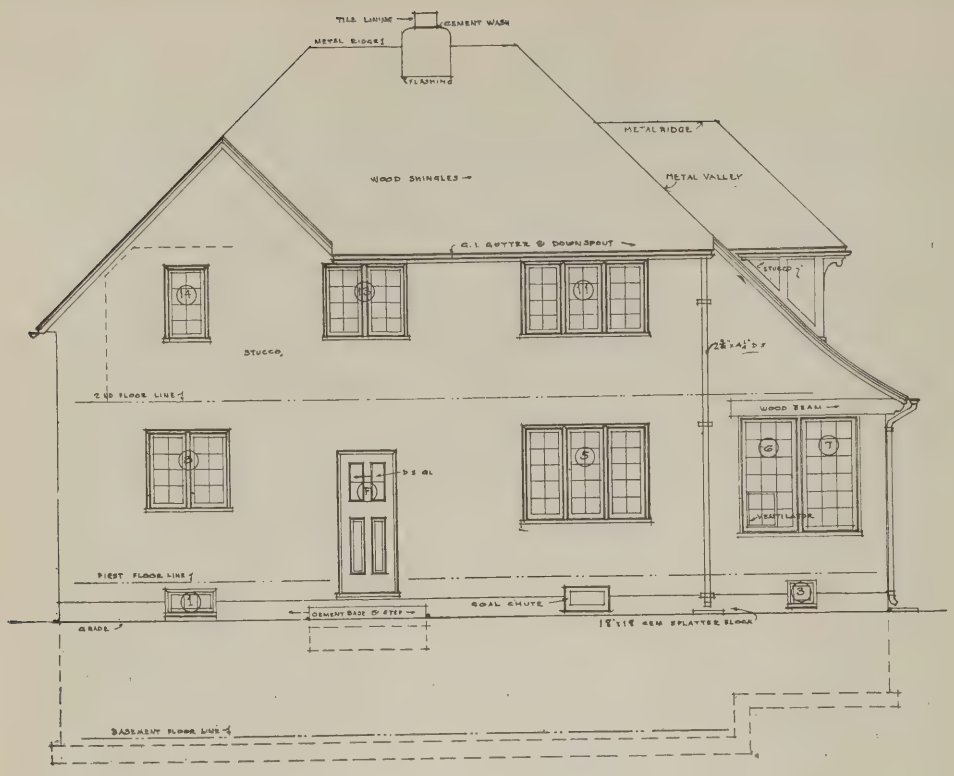
Plans, front elevation and details for House No. 5A58, especially designed for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.



REAR ELEVATION
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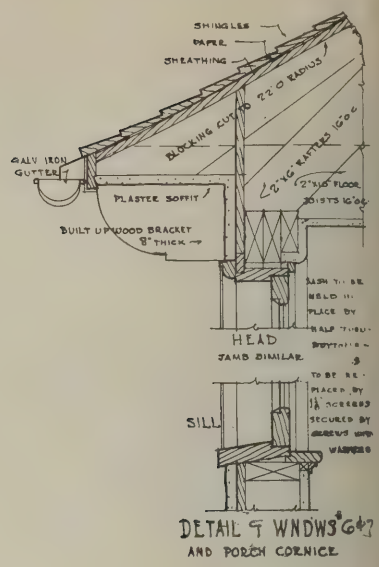
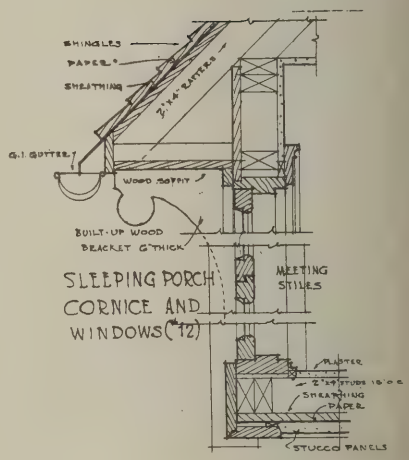
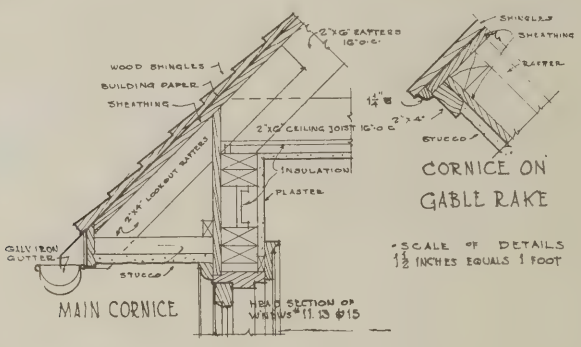
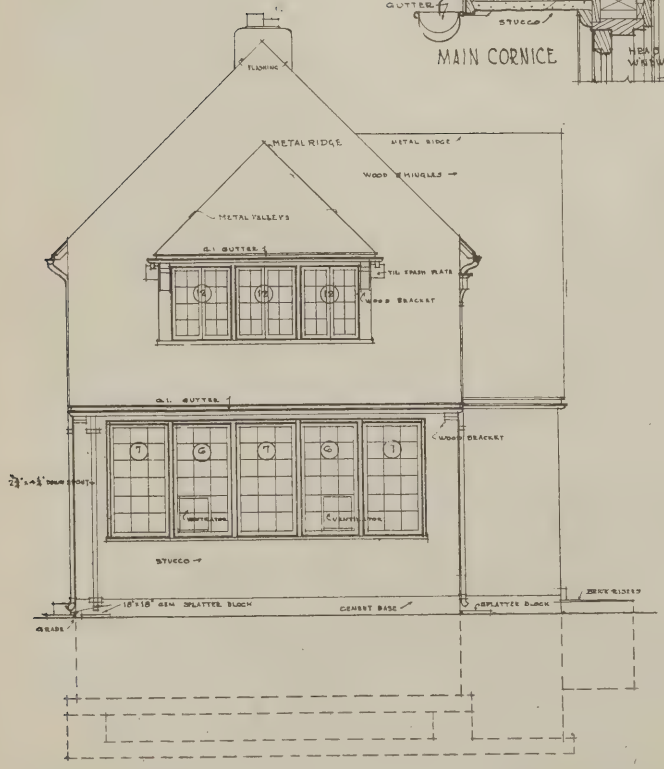
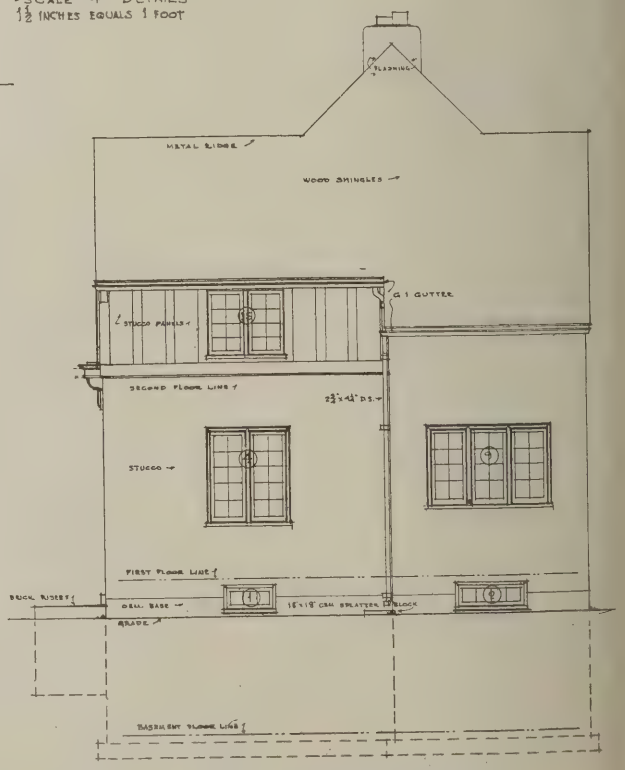








LEFT SIDE ELEVATION
SCALE ¼" = 1'-0"



RIGHT SIDE ELEVATION
SCALE ¼" = 1'-0"

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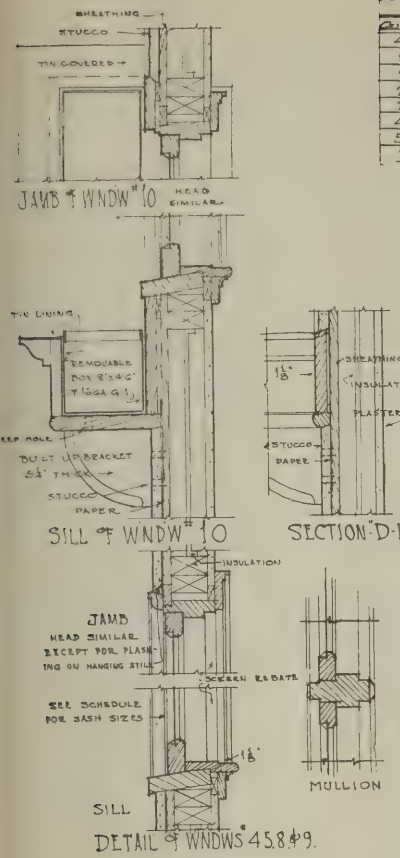
Rear and side elevations and details for House No. 5A58, especially designed for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.



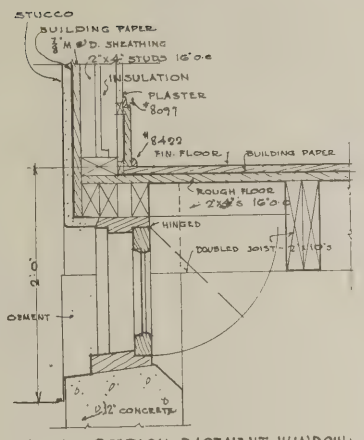
WINDOW SCHEDULE

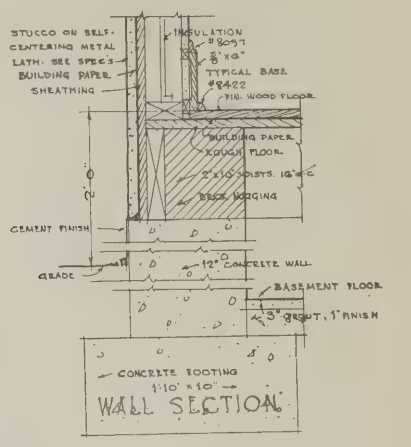
QUAN	TYPE	FRAME	SASH DESC.	SASH SIZE	LIGHTS
4	1	SINGLE	TOP HINGED - DETD	2'-4" x 1'-2" x 1¾"	3 @ 8" x 9"
1	2	"	"	3'-4" x 1'-2" x 1¾"	4 @ 9" x 9"
1	3	"	SIDE " - OUT	1'-2" x 1'-2" x 1¾"	1 @ 10" x 9"
2	4	DOUBLE	S H O 1R. 1L	1'-10⅜" x 4'-8½" x 1¾"	10 @ 9" x 10"
2	5	TRIPLE	" 1 FIXT 1R 1L	1'-10⅜" x 4'-8½" x 1¾"	10 @ 9" x 10"
4	6	SINGLE	REMOVABLE SASH 4 STOPPED AT 4'-6" S H O	3'-0" x 6'-2" x 1¾"	16 @ 10" x 11"
5	7	"	REMOVABLE SASH	3'-0" x 6'-2" x 1¾"	18 @ 10" x 11"
1	8	DOUBLE	S H O 1R. 1L	1'-10⅜" x 3'-10" x 1¾"	8 @ 9" x 10"
1	9	TRIPLE	S H O 1 FIXT 1R 1L	1'-10⅜" x 3'-10" x 1¾"	8 @ 9" x 10"
2	10	DOUBLE	" 1R 1L	1'-10⅜" x 4'-3½" x 1¾"	10 @ 9" x 9"
2	11	TRIPLE	" " "	1'-10⅜" x 3'-6½" x 1¾"	8 @ 9" x 9"
3	12	DOUBLE NO MULL	" " "	1'-6½" x 3'-10" x 1¾"	8 @ 7" x 10"
1	13	DOUBLE	" " "	1'-10⅜" x 3'-6½" x 1¾"	8 @ 9" x 9"
1	14	SINGLE	" 1L	1'-10⅜" x 3'-6½" x 1¾"	8 @ 9" x 9"
1	15	DOUBLE	" 1R 1L	1'-10⅜" x 3'-6½" x 1¾"	8 @ 9" x 9"

DOOR SCHEDULE

QUAN	TYPE	SIZE	DESCRIPTION
BASEMENT			
1	A	2'-8" x 7'-0" x 1⅜"	#720 PINE 5x PANEL
SECOND FLOOR			
2	J	2'-10" x 6'-8" x 1⅜"	#102 BIRCH 2 PANEL
6	K	2'-6" x 6'-8" x 1⅜"	" "
1	L	2'-10" x 6'-8" x 1⅜"	DETAILED GL 6 DS LTS

QUAN	TYPE	SIZE	DESCRIPTION
FIRST FLOOR			
1	B	3'-0" x 7'-0" x 2¼"	DETAILED GL 2 LG. CD
1	C	3'-0" x 7'-0" x 1¾"	#102 OAK 2 PANEL
1	D	2'-8" x 7'-0" x 1¾"	" " DA "
1	E	2'-8" x 7'-0" x 1¾"	" " "
1	F	2'-8" x 7'-0" x 1¾"	DETAILED GL 4 DS LTS
2	G	2'-8" x 7'-0" x 2¼"	GL 5 DS LTS
1	H	2'-4" x 7'-0" x 1¾"	#102 OAK 2 PANEL





EXCAVATING—200 cu. yd.
BACKFILL—54 cu. yd.
FOUNDATION—If 12" concrete, 55 cu. yd. gravel, 222 sax cement; if 9" concrete, 50 cu. yd. gravel, 202 sax cement; if 12" tile, 24500 CBM tile, 18 cu. yd. mortar; if 9" tile, 22100 CBM tile, 15 cu. yd. mortar; 160 face brick; 10 lb. mortar color.
CEMENT FLOOR—4 cu. yd. gravel; 3 cu. yd. sand; 43 sax cement; 5 spatter blocks.
CHIMNEY—3000 common brick; 100 fire brick; 15 sq. ft. hearth tile; 140 inside face brick; 60 lin. ft. 8x12 flue tile; 20 lb. fire clay; 1 cast-iron ash dump; 1 throat and damper; 1 angle-4x3x5/16-4'0"; 2—8x10 cleanout doors; 3—6" adjustable thimbles; 6 yd. metal lath.
LATH—266 yd. metal lath for stucco; 9 yd. metal lath for over boiler; 12,500 wood lath.
PLASTER—266 yd. stucco on metal; 878 yd. plaster on wood; 9 yd. plaster on metal; 15 yd. Keene's cement.
TILE FLOORS—54 sq. ft. ceramic tile; 27 lin. ft. cove base.
LUMBER—4—6x6-7 posts; 70 lin. ft. 2x10 girders; 70 lin. ft. 2x4 girder ribbon; 70 lin. ft. 2x4 basement partition plates; 14—2x4-8 basement partition studs; 180 ft. D & M basement partition sheathing; 4 ft. 2" plank cleanout cover; 3—2x10-16 stair horses; 16—2x8-8 first floor joist; 16—2x10-14 first floor joist; 20—2x10-18 first floor joist; 6—2x10-14 first floor joist; 4—2x10-16 doubles; 5—2x10-14 headers; 50 lin. ft. 2x10 box sill; 360 lin. ft. 1x4 bridging; 1100 ft. com. bds. first floor subfloor; 1280 ft. 13/16x1¼ first floor finish floor; 276 lin. ft. 2x4 first floor partition plates; 86—2x4-9 first floor partition studs; 4—2x10-16 stair horses; 50 lin. ft. 1x6 ribbon; 1500 lin. ft. grounds; 16—2x10-9 second floor joist; 16—2x10-20 second floor joist; 5—2x10-8 second floor joist; 10—2x10-14 second floor joist; 13—2x10-12 second floor joist; 4—2x10-16 headers; 850 ft. com. bds. second floor subfloor; 1140 ft. 13/16x1¼ second floor finish floor; 450 lin. ft. 2x4 second floor partition plates; 130—2x4-8 second floor partition studs; 9—2x6-20 second floor ceiling joist; 13—2x6-18 second floor ceiling joist; 16—2x6-14 second floor ceiling joist; 6—2x6-12 second floor ceiling joist; 3—2x10-18 porch headers; 3—2x10-14 porch headers; 950 ft. D & M attic floor; 2—2x10-12 dormer header; 400 lin. ft. 2x4 outside partition plates; 120—2x4-18 outside wall studs; 20—2x4-14 opening doubles; 8—2x4-16 opening headers; 2800 ft. shiplap O S wall sheathing; 34 lin. ft. 1x6 ridge rafter; 5—2x6-20 rafters; 5—2x6-12 rafters; 20—2x6-14 rafters; 10—2x6-10 rafters; 48—2x6-16 rafters; 4—2x8-20 hip rafters; 2—2x6-14 hip rafters; 1750 ft. com. bds. roof sheathing; 14½ M shingles; 25—2x4-18 extras and scaffold and lookouts; 4—2x6-16 extras and scaffold; 8—2x8-16 extras and scaffold; 7—2x10-14 extras and scaffold; 3—2x12-16 extras and scaffold.
MILLWORK—Frames: 4 single 8x9-3L-1¾; 1 single 9x9-4L-1¾; 1 single 10x9-1L-1¾; 2 mul. casement 9x10-10L-1¾; 2 triple casement 9x10-10L-1¾; 2 mul. frames 10x11-18L-1¾; 1 quintuple casement 10x11-18L-1¾; 1 mul. casement 9x10-8L-1¾; 1 triple casement 9x10-8L-1¾; 1 mul. casement 9x9-10L-1¾; 2 triple casement 9x9-8L-1¾; 1 triple casement 7x10-8L-1¾ for prs.; 1 mul. casement 9x9-8L-1¾; 1 single casement 9x9-8L-1¾; 1 mul. casement 9x9-8L-1¾. **Windows:** 4 sash 8x9-3L-1¾; 1 sash 9x9-4L-1¾; 1 sash 10x9-1L-1¾; 10 sash 9x10-10L-1¾; 9 sash 10x11-18L-1¾; 5 sash 9x10-8L-1¾; 2 sash 9x9-10L-1¾; 11 sash 9x9-8L-1¾; 3 pr. sash 7x10-8L-1¾. **Storm Sash:** 4—8x9-3L-1⅛; 1—9x9-4L-1⅛; 1—10x9-1L-1⅛; 10—9x10-10L-1⅛; 9—10x11-18L-1⅛; 5—9x10-8L-1⅛; 2—9x9-10L-1⅛; 11—9x9-8L-1⅛; 3 pr. 7x10-8L-1⅛. **Screens:** 4—8x9-3L-1⅛; 1—9x9-4L-1⅛; 1—10x9-1L-1⅛; 10—9x10-10L-1⅛; 9—10x11-18L-1⅛; 5—9x10-8L-1⅛; 2—9x9-10L-1⅛; 11—9x9-8L-1⅛; 3 pr. 7x10-8L-1⅛. **Outside Door Frames:** 1—3'0x7'0-2¼; 1—2'8x7'0-1¾; 1 icing door frame. **Outside Doors:** 1—3'0x7'0-2¼; 1—2'8x7'0-1¾; 1 icing door. **Storm Doors:** 1—3'0x7'0-1⅛; 1—2'8x7'0-1⅛. **Screen Doors:** 1—3'0x7'0-1⅛; 1—2'8x7'0-1⅛. **Outside Millwork:** 192 lin. ft. cornice; 2 dormer brackets; 2—9'0 beam brackets; 34 lin. ft. belt course; 120 lin. ft. panel strips; 1—6'0 flower box; 2 flower box brackets. **Interior Doors:** 1—2'8x7'0-1⅜ (No. 720); 2—2'10x6'8-1⅜ (No. 1102); 6—2'6x6'8-1⅜ (No. 1102); 1—2'10x6'8-1¾ (glz.); 1—3'0x7'0-1¾ (No. 1102); 1—2'8x7'0-1¾ (No. 1102); 1—2'8x7'0-1¾ (No. 1102); 4—1'8x7'0-2¼ (Detailed); 1—2'4x7'0-1⅜ (No. 1102). **Jambs:** 1—2'8x7'0; 2—2'10x6'8; 6—2'6x6'8; 1—2'10x6'8; 1—3'0x7'0; 2—2'8x7'0; 2—3'4x7'0; 1—2'4x7'0; 2—7'0 astragals. **Interior Trim:** 4 sides single 8x9-3L; 1 side single 9x9-4L; 1 side single 10x9-1L; 2 sides mul. 9x10-10L; 2 sides triple 9x10-10L; 2 sides mul. 10x11-18L; 1 side quintuple 10x11-18L; 1 side mul. 9x10-8L; 1 side triple 9x10-8L; 1 side mul. 9x9-10L; 2 side triple 9x9-8L; 1 side triple 7x10-8L for pairs; 1 side mul. 9x9-8L; 1 side single 9x9-8L; 1 side mul. 9x9-8L; 1 side door 3'0x7'0; 1 side door 2'8x7'0; 1 side icing door; 2 side door 2'8x7'0; 4 side door 2'10x6'8; 12 side door 2'6x6'8; 2 side door 2'10x6'8; 2 side door 3'0x7'0; 4 side door 2'8x7'0; 4 side door 3'4x7'0; 2 side door 2'4x7'0; 1 flight basement stairs with rail; 1 flight main stairs with rails; 1 scuttle door; 1 scuttle door jamb; 1 side trim; 1 door to medicine closet; 1 jamb, medicine closet; 2 side trim, closet; 1—5'0 linen cupboard; 1—2'0 closet; 1—5'0 bookcase; 1 mantel shelf; 1—2'6 niche shelf; 1—6'0 sink cabinet; 1 corner seat; 1—5'6 kitchen cabinet and worktable; 1—6'0 back entry cupboard; 650 lin. ft. base; 650 lin. ft. base shoe; 650 lin. ft. base molding; 240 lin. ft. picture molding; 66 lin. ft. ceiling cove; 104 lin. ft. closet shelving; 40 lin. ft. closet hook strip; 40 lin. ft. band molding; 16 lin. ft. threshold; 1 radiator grille; 1 meter cabinet.
TINWORK—112 lin. ft. gutter; 2 miters; 14 gutter ends; 40 hangers; 5 nipples; 5 strainers; 5 elbows; 5 shutoffs; 70 lin. ft. conductor; 12 conductor hooks; 2 pc. sheet tin; 12 lin. ft. chimney flashing; 48 lin. ft. ridge roll; 5 finials; 64 lin. ft. hip roll; 46 lin. ft. valley tin; 16 lin. ft. flashing tin; 1 flower box lining.
WEATHER STRIPPING—1 door 3'0x7'0; 1 door 2'8x7'0; 4 sash 8x9-3L; 1 sash 9x9-4L; 1 sash 10x9-1L; 10 sash 9x10-10L; 9 sash 10x11-18L; 5 sash 9x10-8L; 2 sash 9x9-10L; 11 sash 9x9-8L; 3 pr. sash 7x10-8L.
CAULKING—7 single frames; 8 mullion frames; 6 triple frames; 1 quintuple frame; 2 door frames; 1 icing frame; 1 coal chute.
INSULATION—4 rolls felt floors; 4 rolls felt roof; 5 rolls felt walls; 2100 ft. ½" insulation or equal, walls; 800 ft. ½" insulation, second floor ceiling.
HARDWARE—6 cellar sash sets; 37 sets single casement hardware; 3 sets pairs casement hardware; 46 sets storm sash hardware; 46 screen sets; 1 front door set with butts; 1 rear door set with butts; 1 icing door set with butts; 2 storm door sets; 2 screen door sets; 1 floor hinge; 2 push plates; 17 inside door sets with butts; 20 door bumpers; 3 dozen clothes hooks; 1400 lb. nails; 6 lb. brads; 1 coal chute; 4 stair rail brackets; 1 pr. hinges for scuttle door; for back entry cabinet: 3 pr. hinges, 2 locks sets, 1 blind catch: for kitchen cabinet: 12 pr. ornamental butts, 8 cupboard turns, 4 blind catches, 3 drawer pulls; for sink cabinet: 8 pr. ornamental butts, 6 cupboard turns, 2 blind catches; for linen cupboard: 6 drawer pulls; for medicine closet: 2 pr. ornamental butts, 2 cupboard turns, 2 drawer pulls; for meter cabinet: 1 pr. ornamental butts, 1 cupboard turn.
EXTERIOR PAINTING—6 gal. trim paint; 1 gal. boiled oil; 43 gal. shingle stain; 1 gal. screen paint; 1 gal. sash paint; ½ gal. shellac; 1 gal. japan; 10 lb. putty; 3 doz. sheets sandpaper.
INTERIOR PAINTING—13 gal. white paint; 7 gal. enamel; 5 gal. filler stain; 3 gal. shellac; 11 gal. interior varnish; 4 gal. floor shellac; 7 gal. floor varnish; 2 gal. oil; 1 gal. japan; 1 gal. turpentine; 1 gal. alcohol; 5 lb. steel wool.

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Further construction details, window and door schedules and material list for House No. 5A58, especially designed for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.

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A Four-Room House with "Ideal" Brick Walls

House No. 4A31, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.

A SMALL home of brick, with individuality in its exterior and many features that ordinarily go only with larger houses, is shown in House No. 4A31. Although it has individuality, there has been no sacrifice in reasonable building costs.

The construction is the "ideal" wall, especially recommended by the Common Brick Manufacturers' Association of America for small dwellings; that is, the wall is of brick set on edge, rather than laid flat, with a hollow space inside the wall. Solid brick walls could be substituted or brick veneer on wood could be employed.

It is a house especially designed for a narrow lot. It can be built on 30-ft. frontage.

There are four rooms, bath and unusually large and private dining alcove, separated from the kitchen by a plaster arch.

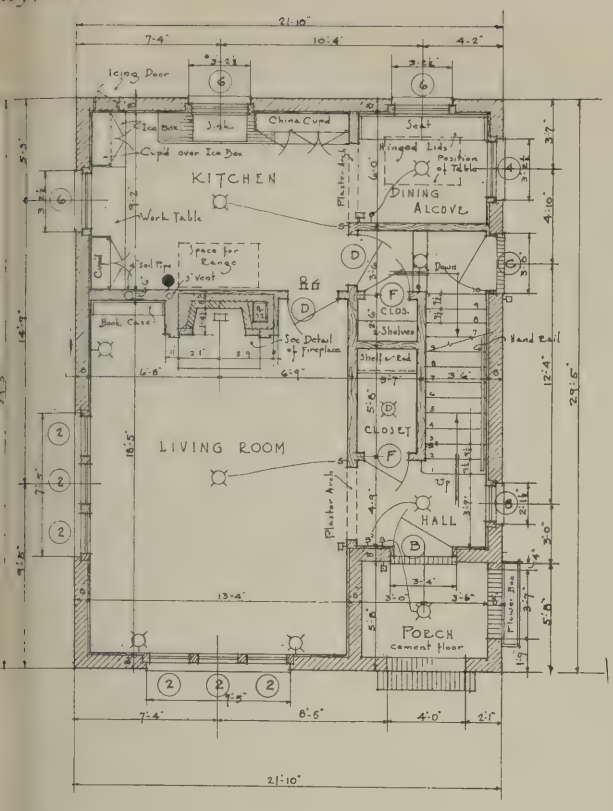
Entrance is through a loggia or enclosed porch, with a brick arched ceiling. This arched doorway and the triple and double window, with their smart brick trim, produce an exceptionally attractive exterior.

A fireplace in the living room with built-in bookcase, a coat closet, a broom closet, outside icing door to the refrigerator and enormous closets in connection with the bedrooms, are interesting features.

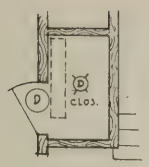
The sleeping accommodations can be increased to practically three bedrooms, as an alternate detail in the working drawings provides for a closet bed off the living room for emergencies.

As designed, the house should face south, or east. Reversed plans will be supplied without extra charge to NATIONAL BUILDER subscribers.

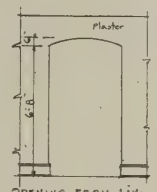
The regular price of this plan is $20.50 ($10.50 to NATIONAL BUILDER subscribers).



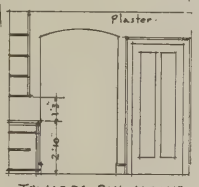
FIRST FLOOR PLAN



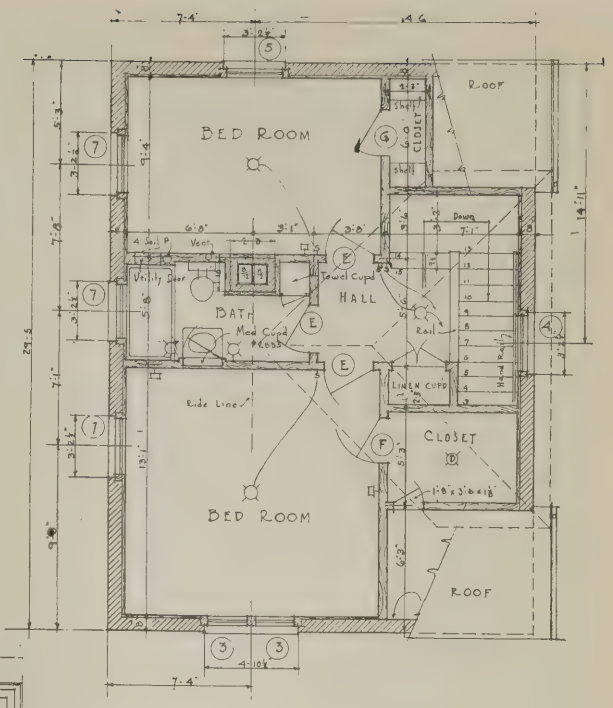
ALTERNATE PLAN OF COAT CLOSET
Showing arrangement to accommodate a closet bed



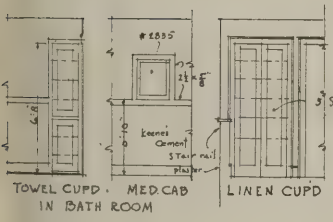
OPENING FROM LIVING ROOM TO HALL



TOWARDS DIN. ALCOVE

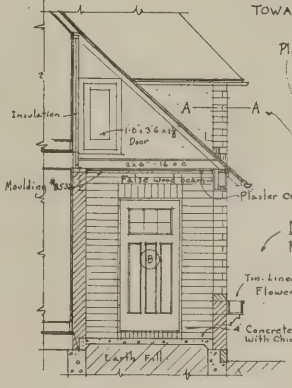


SECOND FLOOR PLAN

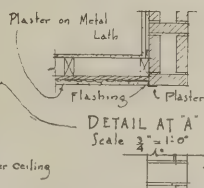


TOWEL CUPD · MED CAB IN BATH ROOM

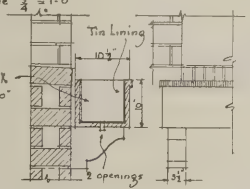
LINEN CUPD



SECTION THROUGH ENTRANCE PORCH
Scale ¼"=1'-0"

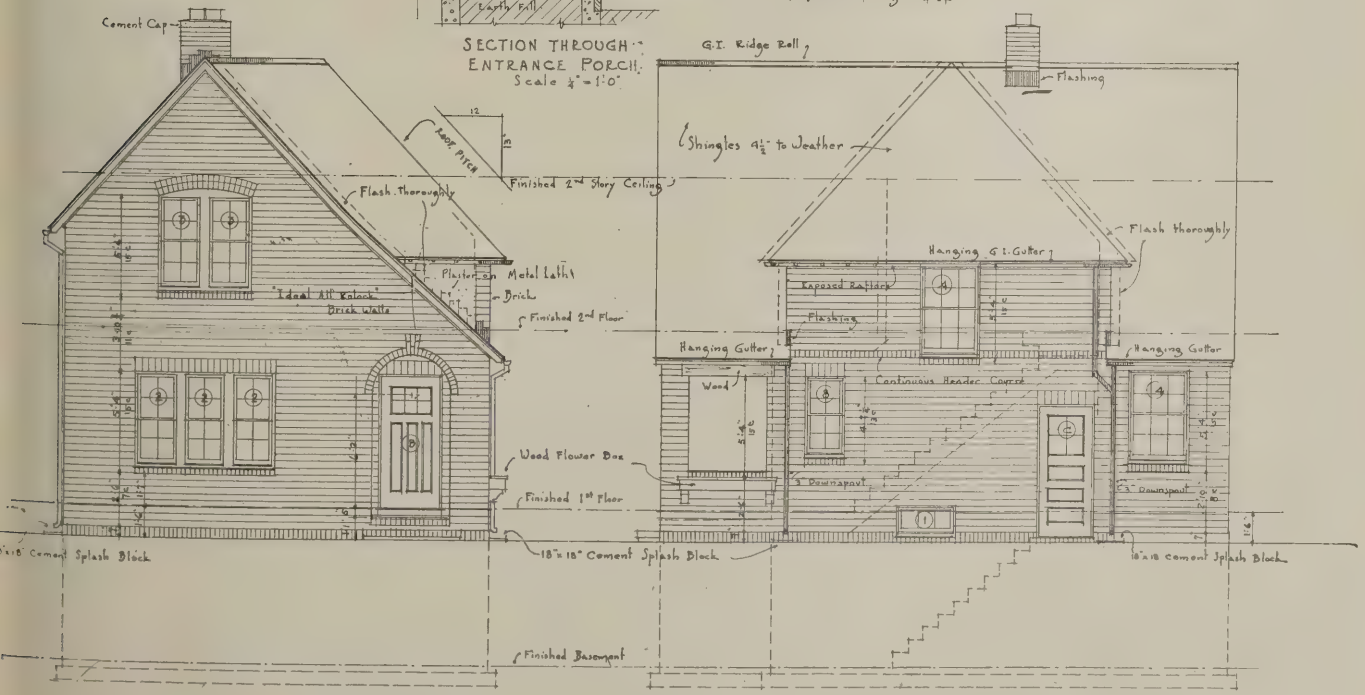


DETAIL AT "A"
Scale ¾"=1'-0"



DETAIL OF FLOWER BOX
Scale ¾"=1'-0"

SCALE ¼"=1'-0"
0 1 2 3 4 5 6 7 8 9



FRONT ELEVATION

SIDE ELEVATION

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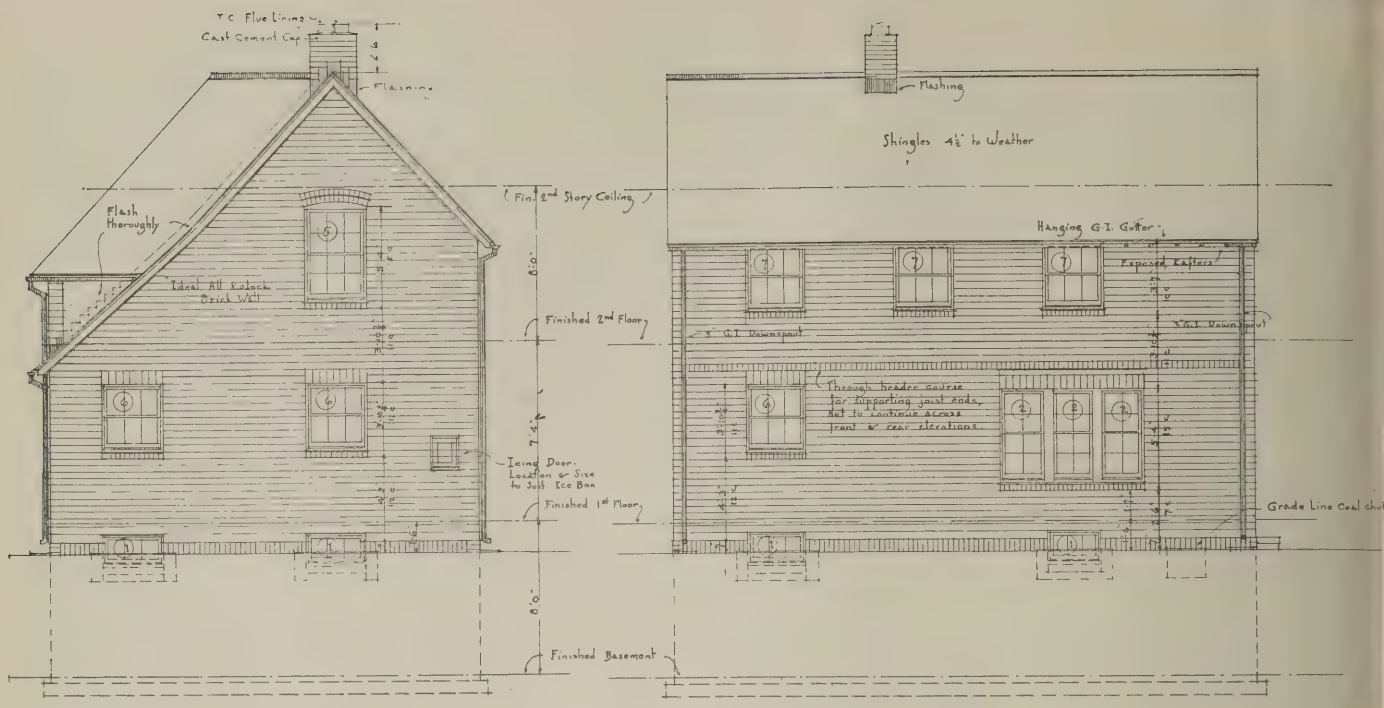
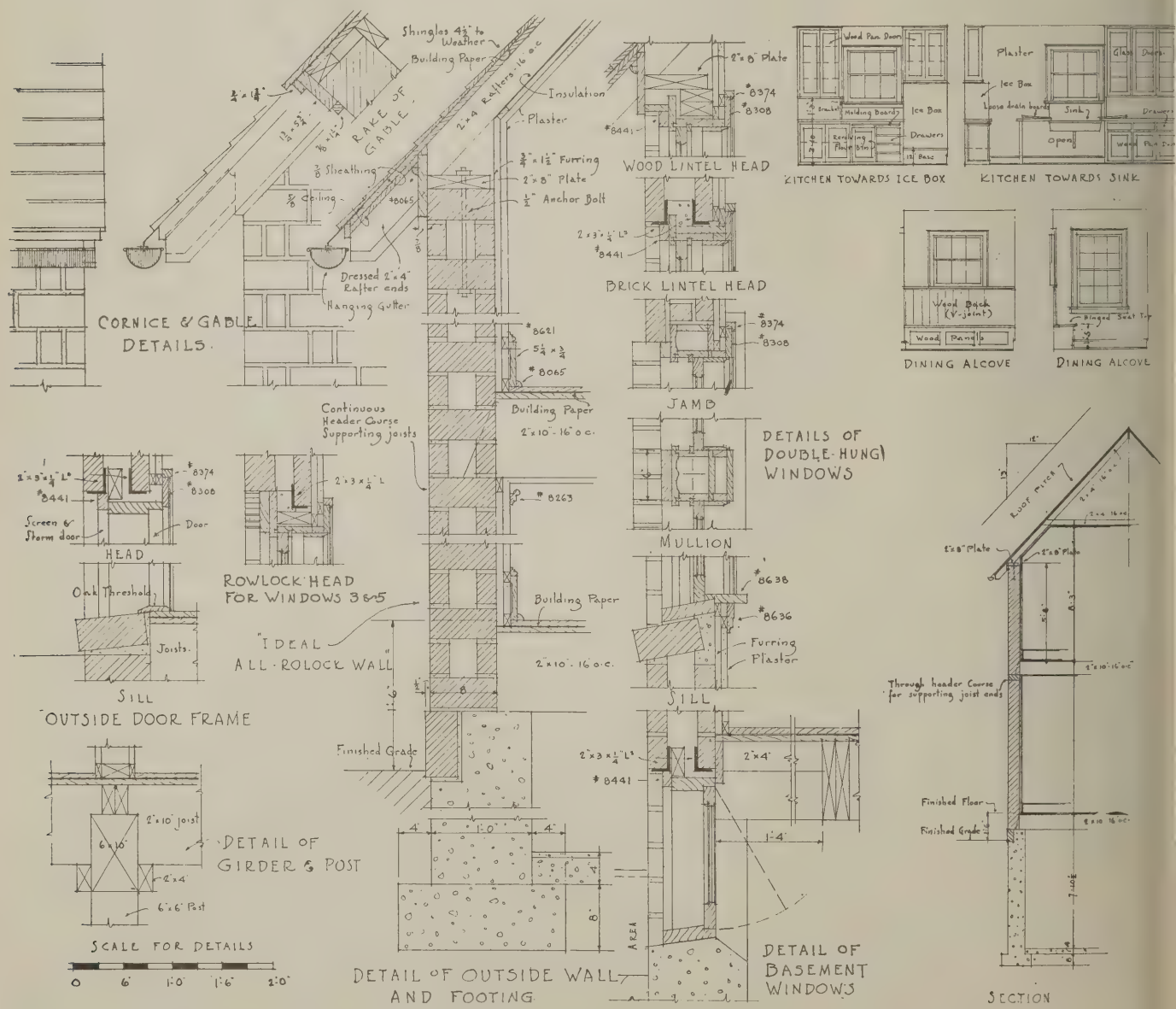
Floor plans, front and side elevations and details for House No. 4A31, especially designed for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.


T.C. Flue Lining
Cast Cement Cap
Flashing
Flash thoroughly
Ideal All Kotack Brick Wall
Finished 2nd Story Ceiling
Finished 2nd Floor
Icing Door. Location & Size to Suit Ice Box
Finished 1st Floor
Finished Basement
Shingles 4½" to Weather
Hanging G.I. Gutter
Exposed Rafters
3" Cast Down Spout
3" G.I. Downspout
Through header course for supporting joist ends, not to continue across front & rear elevations.
Grade Line Coal Chute

REAR · ELEVATION

SIDE · ELEVATION ·



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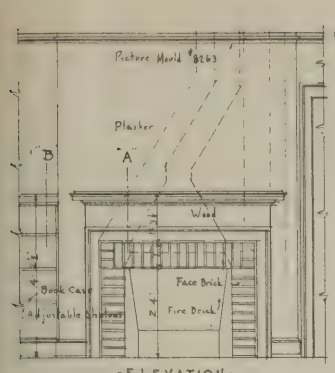
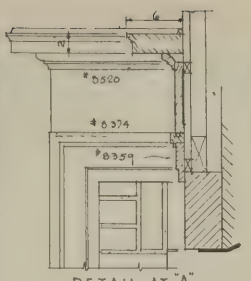
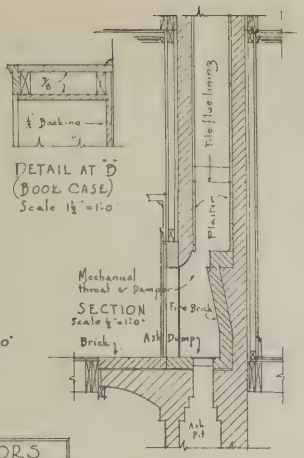
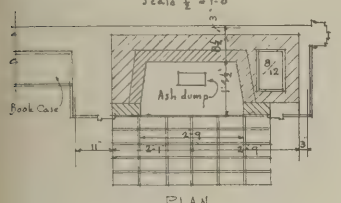
Rear and side elevations and details for House No. 4A31, especially designed for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.



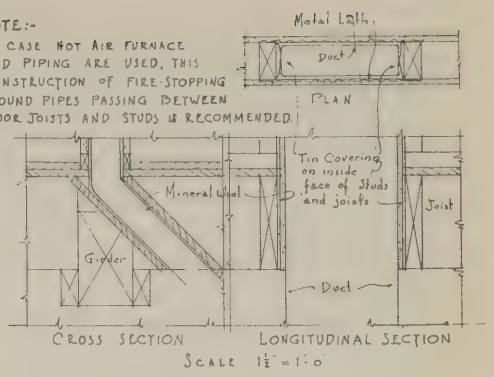


FIRE PLACE DETAILS
Scale ½"=1'-0" and 1½"=1'-0"





NOTE:-
IN CASE HOT AIR FURNACE AND PIPING ARE USED, THIS CONSTRUCTION OF FIRE-STOPPING AROUND PIPES PASSING BETWEEN FLOOR JOISTS AND STUDS IS RECOMMENDED.



SCHEDULE OF DOORS

Quantity	Type	Size	Description	Remarks
1	A	2'-6" x 6'-8" x 1⅜"	Univ. #720	Full Em
1	B	3'-0" x 6'-8" x 1⅜"	" #1256	Front
1	C	2'-8" x 6'-8" x 1⅜"	" #753	Grade Entr.
2	D	2'-8" x 6'-8" x 1⅜"	" #1112	Interior
3	E	2'-6" x 6'-8" x 1⅜"	" #1112	"
3	F	2'-4" x 6'-8" x 1⅜"	" #1112	"
1	G	2'-4" x 5'-10" x 1⅜"	" #1112	"

SCHEDULE OF WINDOWS

Quantity	Type	Description	No. of Lights	Size of Glass	Size of Brick Opening	Thickness of Sash	Remarks
5	1	Basement	3	10x12	See Plans & Elevations	1⅜"	See Detail
6	2	Double-Hung Mullions	8	To be Determ'd	" "	1⅜"	" "
2	3	" "	8	"	" "	1⅜"	" "
2	4	Double-Hung	12	"	" "	1⅜"	Rowlock Head
1	5	" "	12	"	" "	1⅜"	See Detail
1	6	" "	6	"	" "	1⅜"	Rowlock Head
3	7	" "	6	"	" "	1⅜"	See Detail
1	■	" "	8	"	" "	1⅜"	" "

EXCAVATING—134 cu. yd.

BACKFILL—42 cu. yd.

FOUNDATION—If 12" concrete, 43 cu. yd. gravel, 174 sax cement; if 9" concrete, 37 cu. yd. gravel, 150 sax cement; if 12" tile, 19800 CBM tile, 15 cu. yd. mortar; if 9" tile, 17600 CBM tile, 12 cu. yd. mortar.

CEMENT FLOORS—4 cu. yd. gravel; 3 cu. yd. sand; 43 sax cement; 4 splash blocks.

BRICK WALLS—13200 face brick; 14000 common brick; 600 lb. mortar color; 21 cu. yd. mortar.

CHIMNEY—2640 common brick; 120 face brick; 100 fire brick; 18 sq. ft. hearth tile; 140 inside face brick; 50 lin. ft. 8x12 flue tile; 20 lb. fire clay; 3 cu. yd. mortar; 1 cast-iron ash dump; 1 throat and damper; 1 angle 4x3x5/16-4'0; 2—8x12 cleanouts; 3—6" adjustable thimbles; 5 yd. metal lath.

LATH—8000 wood lath; 9 sq. yd. metal lath over boiler; 6 sq. yd. metal lath on dormer.

PLASTER—9 sq. yd. plaster on metal; 6 sq. yd. stucco on metal; 570 sq. yd. plaster on wood lath; 16 sq. yd. Keene's cement.

TILE FLOORS—45 sq. ft. ceramic tile; 32 lin. ft. cove base.

LUMBER—2—6x6-7 posts; 1—4x4-7 posts; 1—6x10-16 girder; 1—6x10-8 girder; 3—2x4-16 girder ribbon; 3—2x10-14 basement stair horses; 4 ft. plank cleanout cover; 3—2x4-14 basement partition plates; 7—2x4-7 basement partition studs; 130 ft. D & M basement partition sheathing; 25—2x10-14 first floor joist; 19—2x10-8 first floor joist; 2—2x10-16 headers; 2—2x10-22 doubles; 620 ft. com. bds. first floor subfloor; 180 lin. ft. 1x3 bridging; 780 ft. 13/16x1½ first floor finish floor; 192 lin. ft. 2x4 first floor partition plates; 58—2x4-9 first floor partition studs; 2—2x10-14 opening headers; 3—2x4-16 opening headers; 8—2x4-14 opening doubles; 6—2x6-7 porch ceiling joist; 25—2x10-14 second floor joist; 19—2x10-8 second floor joist; 4—2x10-14 headers; 4—2x10-16 stair horses; 550 ft. com. bds. second floor subfloor; 640 ft. 13/16x1½ second floor finish floor; 300 lin. ft. 2x4 second floor partition plates; 88—2x4-8 second floor partition studs; 24—2x4-10 second floor ceiling joist; 5—2x4-12 second floor ceiling joist; 70 lin. ft. 2x8 wall plates; 4—2x4-12 dormer plates; 3—2x4-16 dormer studs; 100 ft. shiplap wall sheathing; 98—1x2-8 wall stripping; 98—1x2-9 wall stripping; 1100 lin. ft. grounds; 2—2x6-18 valley rafters; 2—2x4-18 hip rafters; 36 lin. ft. 1x6 ridge rafter; 30—2x4-12 rafters; 16—2x4-22 rafters; 22—2x4-14 rafters; 1300 ft. com. bds. roof sheathing; 10½ M shingles; 25—2x4-16 scaffold for brick work; 8—2x6-16 scaffold for brick work; 10—2x8-14 scaffold for brick work; 4—2x10-14 scaffold for brick work; 4—2x12-14 scaffold for brick work; 400 ft. D & M attic floor.

MILLWORK—Frames: 5 single 10x12-3L-1⅜ No. 1; 2 triple (no size)-8L-1⅜ No. 2; 1 mul. (no size)-8L-1⅜ No. 3; 2 single (no size)-12L-1⅜ No. 4; 1 single (no size)-12L-1⅜ No. 5; 3 single (no size)-6L-1⅜ No. 6; 3 single (no size)-6L-1⅜ No. 7; 1 single (no size)-8L-1⅜ No. 8. **Windows:** 5 sash No. 1-10x12-3L-1⅜; 6 wds. No. 2-get size-8L-1⅜; 2 No. 3-get size-8L-1⅜; 2 No. 4-get size-12L-1⅜; 1 No. 5-get size-12L-1⅜; 3 No. 6-get size-6L-1⅜; 3 No. 7-get size-6L-1⅜; 1 No. 8-get size-8L-1⅜. **Storm Sash:** 5—10x12-3L-1⅛; 6 No. 2-8L-1⅛; 2 No. 3-8L-1⅛; 2 No. 4-12L-1⅛; 1 No. 5-12L-1⅛; 3 No. 6-6L-1⅛; 3 No. 7-6L-1⅛; 1 No. 8-8L-1⅛. **Screens:** 5—10x12-3L-1⅛; 6 No. 2-8L-1⅛; 2 No. 3-8L-1⅛; 2 No. 4-12L-1⅛; 1 No. 5-12L-1⅛; 3 No. 6-6L-1⅛; 3 No. 7-6L-1⅛; 1 No. 8-8L-1⅛. **Outside Door Frames:** 1—3'0x6'8-1¾; 1—2'8x6'8-1¾; 1 icing door frame. **Exterior Doors:** 1—3'0x6'8-1¾ (No. 1256); 1—2'8x6'8-1¾ (No. 753); 1 icing door. **Storm Doors:** 1—3'0x6'8-1⅛; 1—2'8x6'8-1⅛. **Screen Doors:** 1—3'0x6'8-1⅛; 1—2'8x6'8-1⅛. **Outside Millwork:** 142 lin. ft. cornice; 1 wood lintel, 4'6; 1—5'0 flower box; 28 lin. ft. porch ceiling cove; 2 flower box brackets. **Interior Doors:** 1—2'6x6'8-1⅜ (No. 720); 2—2'8x6'8-1⅜ (No. 1112); 3—2'6x6'8-1⅜ (No. 1112); 3—2'4x6'8-1⅜ (No. 1112); 1—2'4x5'10-1⅜ (No. 1112). **Jambs:** 1—2'6x6'8; 2—2'8x6'8; 3—2'6x6'8; 3—2'4x6'8; 1—2'4x5'10. **Interior Trim:** 5 sides single sash 10x12-3L; 2 sides triple No. 2; 1 side mul. No. 3; 2 sides single No. 4; 1 side single No. 5; 3 sides single No. 6; 3 sides single No. 7; 1 side single No. 8; 1 side door 3'0x6'8; 1 side door 2'8x6'8; 1 side icing door; 2 side door 2'6x6'8; 4 side door 2'8x6'8; 6 side door 2'6x6'8; 6 side door 2'4x6'8; 2 side door 2'4x5'10; 1 flight basement stair with rail; 1 flight grade stair; 1 flight main stair with rail; 1 linen closet; 1 medicine cabinet (No. 2835); 1 utility door; 1 utility door jamb; 1 utility door trim; 1 towel cabinet; 1 alcove table; 1 alcove seat with cover; 1 mantel shelf; 1—5'0 kitchen cupboard; 2—3'0 kitchen cupboards with worktable; 2 drain boards; 1—3'8 bookcase; 460 lin. ft. 3 mem. base; 300 lin. ft. picture molding; 20 lin. ft. closet shelving; 20 lin. ft. closet hook strip; 30 lin. ft. panel molding; 80 lin. ft. ceiling cove. **Note:** If living room trim is changed, it will affect the following items: 1 door 3'0x6'8-1¾ (No. 1256); 1 side trim 3'0x6'8; 1 door 2'4x6'8-1⅜ (No. 1112); 1 side trim 2'4x6'8; 1 door 2'8x6'8-1⅜ (No. 1112); 1 side trim 2'8x6'8; 1 side trim No. 8; 2 side triple wd. trim No. 2; 1—3'8 bookcase; 1 mantel shelf; 80 lin. ft. ceiling cove; 80 lin. ft. picture molding; 74 lin. ft. 3 mem. base; 1 flight main stairs with rail.

TINWORK—37 lin. ft. ridge roll; 3 finials; 36 lin. ft. valley tin; 36 lin. ft. hip roll; 1 flower box lining; 10 lin. ft. chimney flashing; 16 lin. ft. sidewall flashing; 66 lin. ft. gutter; 8 gutter ends; 20 gutter hangers; 2 outside miters; 5 nipples; 5 strainers; 5 elbows; 5 offsets; 4 shutoffs; 56 lin. ft. conductor pipe; 15 conductor hooks.

LINTELS—5 for sash 10x12-3L; 2 for triple No. 2; 1 for mul. No. 3; 1 for single No. 4; 1 for single No. 5; 3 for single No. 6; 1 for single No. 8; 1 for 3'0 doors; 1 for 2'8 door; 1 for icing door.

REINFORCING STEEL—11—⅜ rods, 7'0.

HARDWARE—5 cellar sash set; 18 sash locks; 18 sash lifts; 23 storm sash sets; 23 screen set; 1 front door set with butts; 1 rear door set with butts; 1 icing door set with butts; 2 storm door sets with butts; 2 screen door sets with butts; 1 floor hinge; 2 push plates; 9 inside door sets with butts; 12 door bumpers; 4 stair rail brackets; 3 doz. clothes hooks; 700 lb. assorted nails; 5 lb. assorted brads; 540 lb. sash weights; 5 hanks sash cord; 1 coal chute; for medicine cabinet: 1 pr. ornamental butts, 1 cupboard turn; for utility door: 4 friction stays; for towel cabinet: 2 pr. ornamental butts, 2 cupboard turns; for linen closet: 2 pr. butts, 1 casement lock, 1 blind catch, 1 pr. hinges for seat; for kitchen cabinet: 6 pr. ornamental butts, 4 cupboard turns, 2 blind catches, 3 drawer pulls; kitchen cabinets: 6 pr. ornamental butts, 3 cupboard turns, 3 elbow catches, 1 bin pull, 1 set castors, 4 drawer pulls, 2 molding board pulls, 1 bracket; 2 drain board brackets; 30 anchor bolts for plates.

WEATHER STRIPPING—5 sash 10x12-3L; 6 windows No. 2; 2 windows No. 3; 2 windows No. 4; 1 window No. 5; 3 windows No. 6; 3 windows No. 7; 1 window No. 8; 1 door 3'0x6'8; 1 door 2'8x6'8.

CAULKING—15 single window frames; 2 triple window frames; 1 mullion window frame; 2 door frames; 1 icing frame; 1 coal chute.

INSULATION—3 rolls felt for floors; 3 rolls felt for roof; ½ roll felt for walls; 560 ft. ½" insulation for second floor ceiling.

EXTERIOR PAINTING—2 gal. trim paint; 1 gal. sash color; 1 gal. screen paint; 30 gal. shingle stain; 1 gal. japan; 10 lb. putty.

INTERIOR PAINTING—10 gal. white paint; 6 gal. enamel; 4 gal. filler stain; 2 gal. shellac; 3 gal. floor shellac; 9 gal. interior varnish; 4 gal. floor varnish; 1 gal. oil; 1 gal. turpentine; 1 gal. alcohol; 3 lb. steel wool; 3 doz. sheets sandpaper.

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Details and door and window schedules and quantity survey for House No. 4A31, especially designed for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.

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An Unsymmetrical New England Colonial Design

House No. 6A53, designed especially for National Builder by the Lake division of The Architects' Small House Service Bureau of the United States, Inc.

ONE usually thinks of the New England Colonial house as being perfectly symmetrical. It need not necessarily be so, however, as shown in this attractive design, which is unsymmetrical. Notice, however, its perfect balance — something not always easy to achieve.

A corner lot would be the ideal lot for this six-room New England Colonial home. The porch could face one street, and the entrance the other.

If placed lengthwise on the lot, or on a corner, it needs only a 30 to 35-ft. frontage. Otherwise it will require a 60-ft. frontage, if built with the porch as featured here; or 50-ft. frontage if built without the porch.

If built on a wide lot it should face west or east. Reversed plans, for other facings, are supplied without extra charge.

This design is similar to design 6A49, shown in April. There is, however, a great difference in the exterior of these two plans; 6A49 is carried out in brick in the English style, while the design shown here follows the New England Colonial, and is of frame throughout. This choice of exteriors should increase the usefulness of this design to builders and home owners.

The central position of the entrance and the convenient front hall combine to provide quick access to all parts of the house.

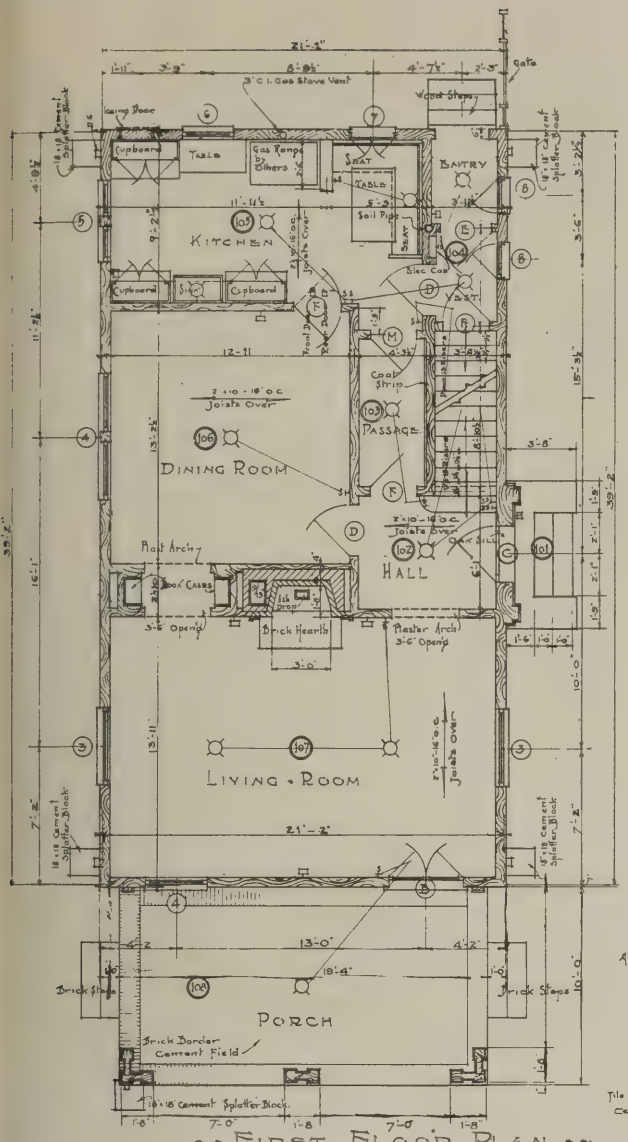
The privacy of the dining room is a point that should be called to the attention of women interested in this design, because it is shut off from the rest of the house.

In the kitchen provision is made for a breakfast nook, and in its appointments and arrangements the kitchen is scientifically planned to lighten housework.

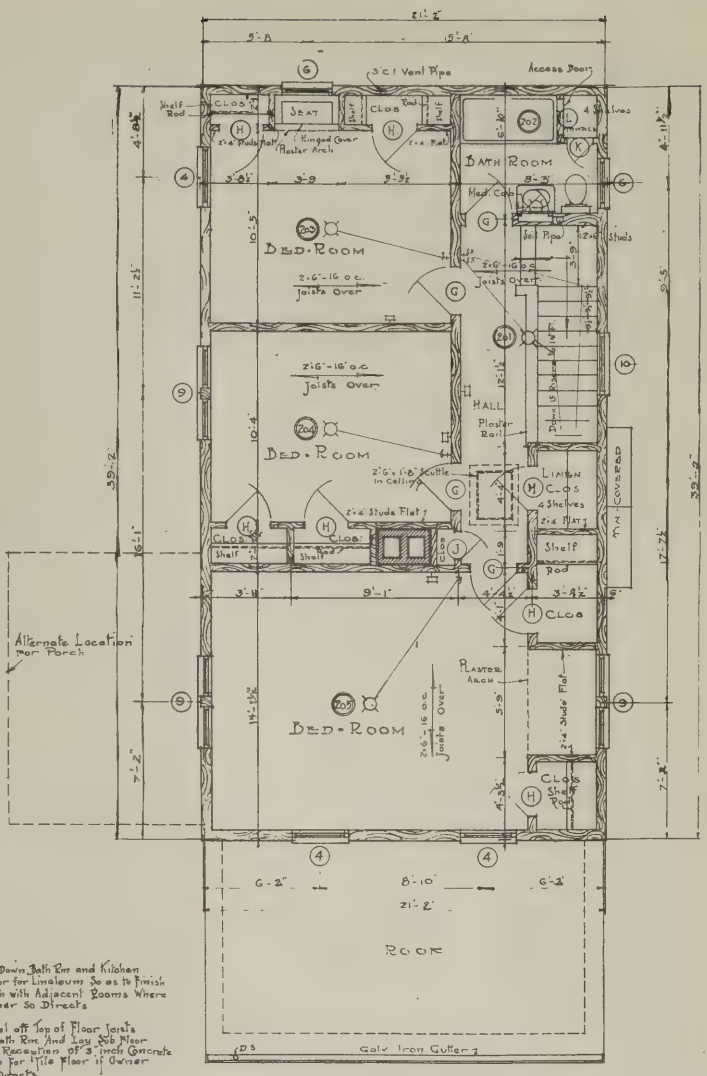
On the second floor there are three bedrooms, bath, large linen closet and an extra closet for vacuum cleaner and brooms. Each bedroom has two closets, a feature that is unusual in a house of this size.

The arrangement of the six rooms is excellent and on both floors every effort has been made to provide those comforts and conveniences so dear to the home builder.

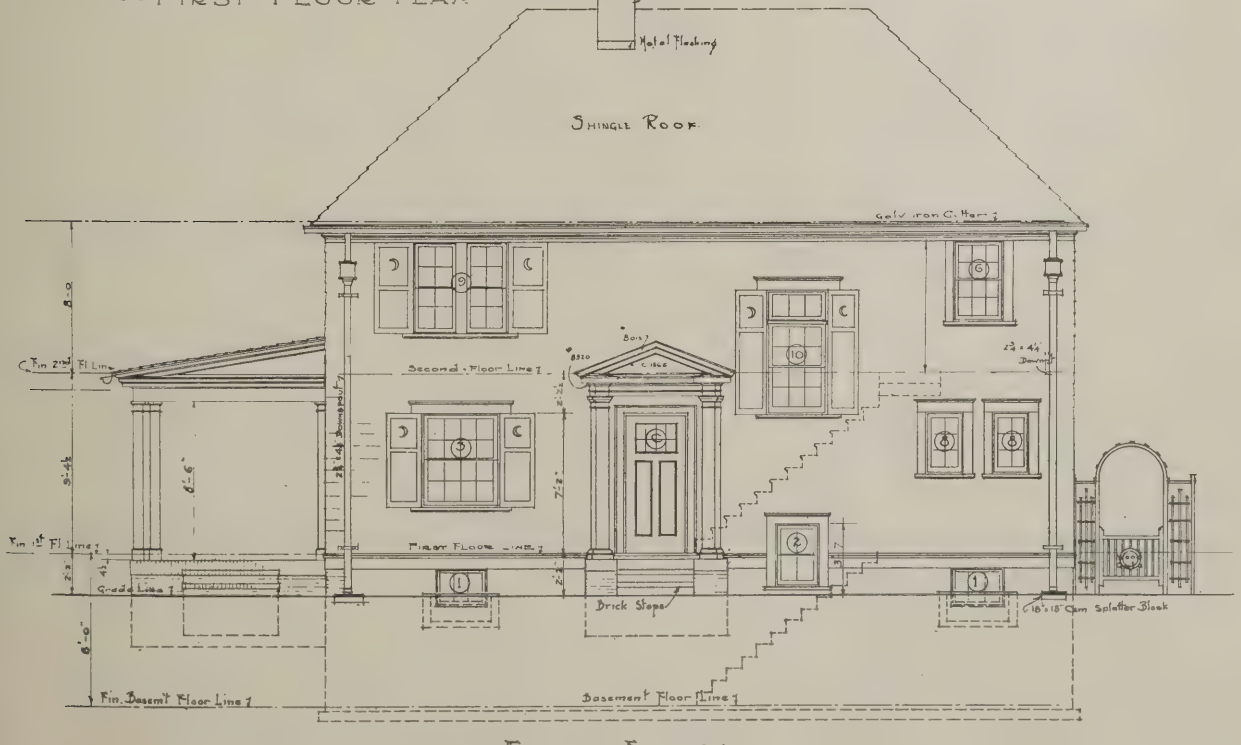
The regular price of this design is $30.50 ($15.50 to NATIONAL BUILDER subscribers).



FIRST FLOOR PLAN



SECOND-FLOOR PLAN



FRONT-ELEVATION
SCALE 1/4"-1'-0"

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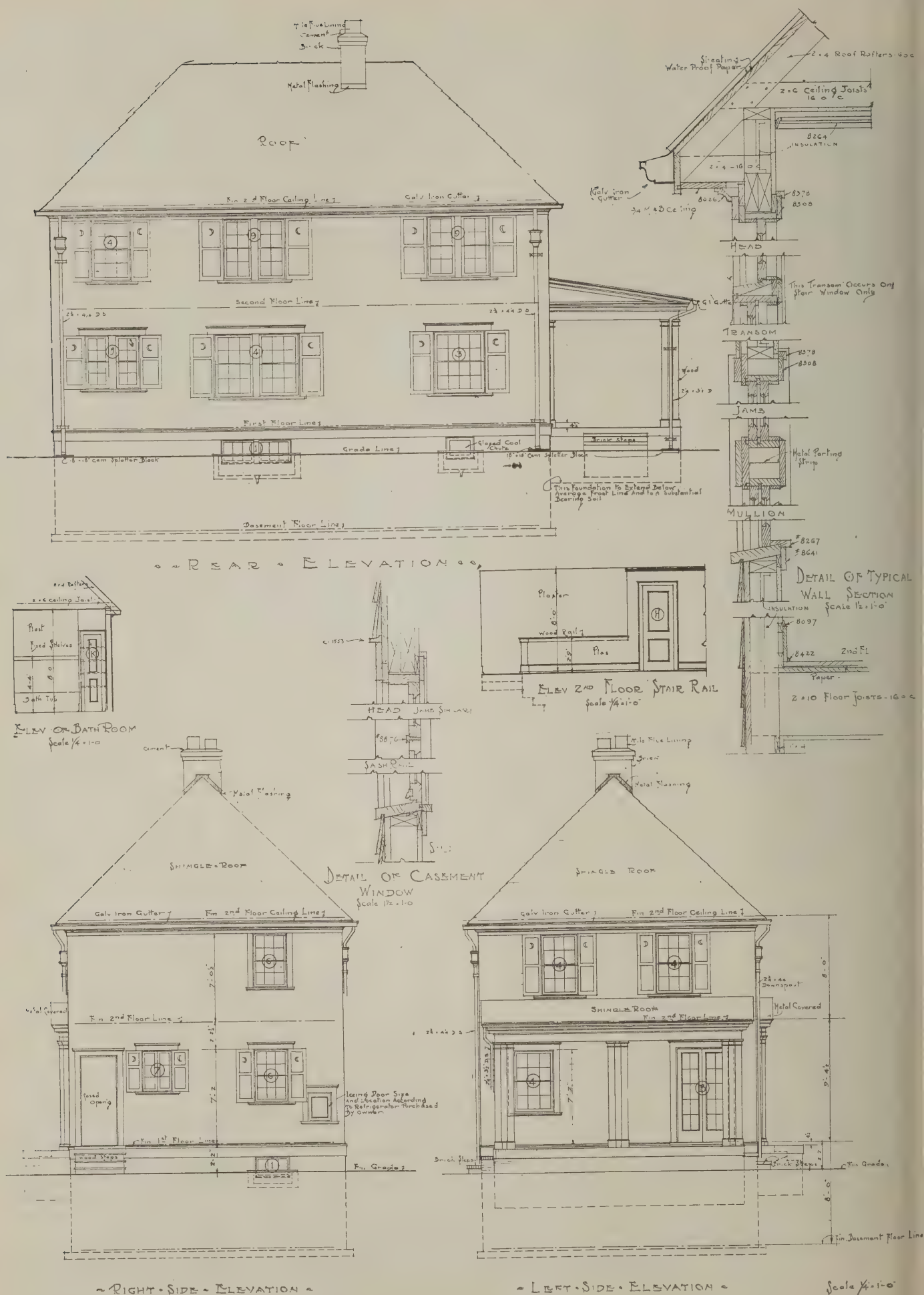
Floor plans and front elevation for House No. 6A53, especially designed for National Builder by the Lake division of The Architects' Small House Service Bureau of the United States, Inc.



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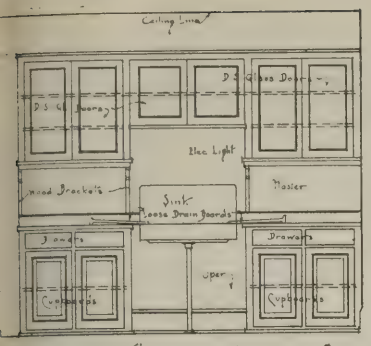
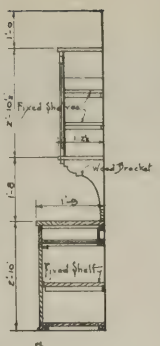
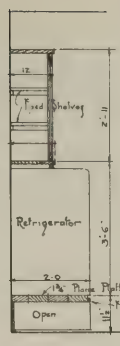
Rear and side elevations and details for House No. 6A53, especially designed for National Builder by the Lake division of The Architects' Small House Service Bureau of the United States, Inc.



ELEV. OF KITCHEN TOWARD SINK
Scale ½"=1'-0"



SECTION



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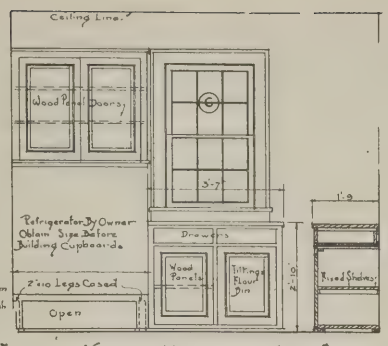
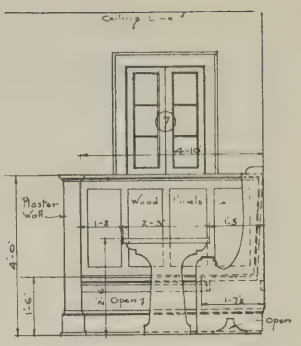


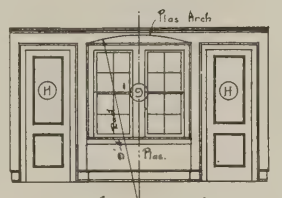
ELEV. OF KITCHEN TOWARD ICE BOX
Scale ½"=1'-0"

SECT.

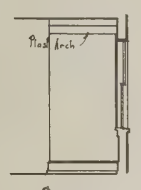


ELEV. OF TABLE AND SEAT IN KITCHEN
Scale ½"=1'-0"

EXCAVATING—220 cu. yd.
BACKFILL—30 cu. yd.
FOUNDATION—If 12" concrete, 54 cu. yd. ravel, 218 sax cement; if 9" concrete, 44 cu. yd. ravel, 178 sax cement; if 12" tile, 26100 CBM ile, 19 cu. yd. mortar; if 9" tile, 21000 CBM tile, 5 cu. yd. mortar; 1300 face brick, 60 lb. mortar olor.
CEMENT FLOOR—7 cu. yd. gravel; 5 cu. yd. and; 73 sax cement; 5 cement spatter blocks.
CHIMNEY—3000 common brick; 240 face brick; 00 fire brick; 18 sq. ft. hearth tile; 160 inside ace brick; 70 lin. ft. 8x12 flue tile; 20 lb. fire lay; 3 cu. yd. mortar; 1 cast-iron ash dump; throat and damper; 1 angle 4x3x5/16-4'0; 2—x12 cleanout doors; 3—6" adjustable thimbles; yd. metal lath.
LATH—9 yd. metal over boiler; 10500 wood.
PLASTER—9 yd. on metal lath; 752 yd. on wood lath; 14 yd. Keene's cement.
TILE—28 sq. ft. ceramic tile; 22 lin. ft. cove base.
LUMBER—5—6x6-7 posts; 1—4x4-7 posts; 1—6x10-7 girder; 1—6x10-8 girder; 1—6x10-22 girder; 1—6x10-16 girder; 3—2x4-20 basement partition plates; 16—2x4-7 basement partition studs; 380 ft. D & M basement partition sheathing; 3—2x 10-14 stair horses; 17—2x10-10 first floor joist; 17—2x10-16 first floor joist; 17—2x10-14 first floor joist; 84 lin. ft. 2x10 box sill; 2—2x10-10 doubles; 2—2x10-16 doubles; 2—2x10-14 doubles; 4—2x10-16 headers; 930 ft. com. bds. subfloor first floor; 1140 ft. 13/16x1½ first floor finish floor; 300 lin. ft. 1x3 bridging; 252 lin. ft. 2x4 first floor partition plates; 74—2x4-9 first floor partition studs; 1—2x10-14 stair horses; 17—2x10-14 second floor joist; 17—2x10-9 second floor joist; 15—2x10-22 second floor joist; 3—2x10-16 headers; 840 ft. com. bds. second floor subfloor; 1080 ft. 13/16x 1½ second floor finish floor; 2—2x10-10 porch girder; 1—2x10-20 porch girder; 2—2x6-10 porch girder; 1—2x6-20 porch girder; 16—2x6-10 porch ceiling joist; 225 ft. ⅝x4 ceiling porch; 44 lin. ft. 1x6 ribbon; 15—2x4-9 collar ties; 17—2x6-14 second floor ceiling joist; 21—2x6-22 second floor ceiling joist; 330 lin. ft. 2x4 second floor partition plates; 90—2x4-8 second floor partition studs; 950 ft. D & M attic floor; 2—2x6-14 headers; 348 lin. ft. 2x4 outside wall plates; 102 2x4-18 outside wall studs; 4—2x4-16 porch studs; 25—2x4-14 lookouts; 10—2x4-16 opening doubles and headers; 16—2x4-12 porch rafters; 4—2x4-4 porch rafters; 1—1x6-18 ridge rafter; 4—2x4-20 hip rafters; 63—2x4-16 rafters; 2300 ft. shiplap wall sheathing; 2500 ft. siding wall sheathing; 1900 ft. bds. roof sheathing; 13½ M shingles; 20—2x4-18 scaffold and headers and extras; 8—2x6-12 scaffold and headers and extras; 5—2x10-14 scaffold and headers and extras; 3—2x12-16 scaffold and headers and extras; 1200 lin. ft. grounds.
MILLWORK—Frames: 3 single sash 8x10-3L-1¾; 1 mul. sash 8x10-3L-1¾; 1 single wd. 10x16-4L-1⅜; 2 single wd. 10x12-16L-1⅜; 4 single window 10x12-12L-1⅜; 1 mul. wd. 10x12-12L-1⅜; 1 mul. wd. 8x10-8L-1¾; 1 mul. wd. 8x10-12L-1⅜; 1 single wd., 8x10-12L-1¾; 1 mul. casement 8x10-3L-1¾; 2 single casement 8x10-6L-1¾; 3 mul. wd. 10x12-8L-1⅜; 1 single wd. 10x12-12L-1⅜ tr. 10x12-3L. **Windows:** 5 cellar sash 8x10-3L-1¾; 1 wd. 10x16-4L-1⅜; 2—10x12-16L-1⅜; 6—10x12-4L-1⅜; 2—8x10-8L-1⅜; 3—8x10-12L-1⅜; 2 casement sh. 8x10-3L-1¾; 2 casement sh. 8x10-6L-1¾; 6 wds. 10x12-8L-1¾; 1 wd. 10x12-12L-1⅜; 1 transom 10x12-3L-1⅜. **Storm Sash:** 5—8x10-3L-1⅛; 1—10x16-4L-1⅛; 2—10x12-16L-1⅛; 6—10x12-4L-1⅛; 2—8x10-8L-1⅛; 3—8x10-12L-1⅛; 2—8x10-3L-1⅛; 2—8x10-6L-1⅛; 6—10x12-8L-1⅛; 1—10x12-12L-1⅛; 1—10x12-3L-1⅛. **Screens:** 5—8x10-3L-1⅛; 1—10x16-4L-1⅛; 2—10x12-16L-1⅛; 6—10x12-4L-1⅛; 2—8x10-8L-1⅛; 3—8x10-12L-1⅛; 2—8x10-3L-1⅛; 2—8x10-6L-1⅛; 6—10x12-8L-1⅛; 1—10x12-12L-1⅛; 1—10x12-3L-1⅛. **Shutters:** 2 pr. for wds. 10x12-16L-1⅛; 5 pr. for wds. 10x12-12L-1⅛; 2 single for wds. 8x10-8L-1⅛; 1 pr. for wds. 8x10-12L-1⅛; 1 pr. for 2 sh. 8x10-3L-1⅛; 4 single for wds. 10x12-8L-1⅛; 1 pr. for wd. 10x12-12L tr. 10x12-3L-1⅛. **Outside Door Frames:** 1 double opng. 4'0x7'0-1¾; 1 single 3'0x7'0-1¾; 1 single 2'8x7'0-1¾; 1 icing door frame. **Outside Doors:** 2—2'0x7'0-1¾ (No. 1600); 1—3'0x7'0-1¾ (No. 1246); 1—2'8x7'0-1¾ (No. 970); 1 icing door. **Storm Doors:** 1 pr. 2'0x7'0-1⅛; 1 single 3'0x7'0-1⅛; 1 single 2'8x7'0-1⅛. **Screen Doors:** 1 pr. 2'0x7'0-1⅛; 1—3'0x7'0-1⅛; 1—2'8x7'0-1⅛. **Outside Millwork:** 186 lin. ft. cornice; 1 special entrance trim; 1 set rear steps; 120 lin. ft. base; 120 lin. ft. water drip; 120 lin. ft. water drip molding; 1 gate; 2 gate panels with arch; 8 porch posts; 2 half porch posts; 40 lin. ft. porch facia; 40 lin. ft. porch frieze; 40 lin. ft. porch inside facia; 60 lin. ft. porch cove. **Interior Doors:** 1 2'8x6'6-1⅜ (No. 720); 2—2'8x7'0-1⅜ (No. 1102); 3—2'6x7'0-1⅜ (No. 1102); 5—2'6x 6'10-1⅜ (No. 1102); 7—2'4x6'10-1⅜ (No. 1102); 1—1'6x6'10-1⅜ (No. 1102); 1 door 1'4x6'0-1⅜ (No. 1102); 1 door 1'6x2'0-1⅜ (1 P); 1 door 2'6x7'0-1⅜ (No. 1212). **Jambs:** 1—2'8x6'6; 2—2'8x7'0; 3—2'6x7'0; 5—2'6x6'10; 7—2'4x6'10; 1—1'6x6'10; 1—1'4x6'0; 1—1'6x2'0; 1—2'6x7'0. **Interior Trim:** 3 sides single 8x10-3L; 1 side mul. 8x10-3L; 1 side single 10x16-4L; 2 sides single 10x12-16L; 4 sides single 10x12-12L; 1 side mul. 10x12-12L; 1 side mul. 8x10-8L; 1 side mul. 8x10-12L; 1 side single 8x10-12L; 1 side mul. casement 8x10-3L; 2 sides single casement 8x10-6L; 3 sides mul. wd. 10x12-8L; 1 side single wd. 10x12-12L tr. 10x12-3L; 1 side double dr. opening 4'0x7'0; 1 astragal 7'0; 1 side door 3'0x7'0; 1 side door 2'8x7'0; 1 side icing door; 2 side dr. 2'8x6'6; 4 side dr. 2'8x7'0; 6 side door 2'6x7'0; 10 side door 2'6x6'10; 14 side door 2'4x6'10; 2 side door 1'6x6'10; 2 side door 1'4x6'0; 2 side door 1'6x2'0; 2 side door 2'6x7'0; 1 flight basement stair with rail; 1 flight main stair with rail; 1 mantel shelf; 2 bookcases; 2—3'0 kitchen cupboards; 1—3'6 kitchen cupboard; 1—3'6 kitchen table; 1 corner seat; 1 breakfast room table; 1 electric cabinet; 1 hinged covered seat; 1 utility jamb, door and trim; 2 drain boards; 1 medicine cabinet; 1 scuttle door 1'8x2'6; 1 scuttle door jamb 1'8x2'6; 1 side trim 1'8x2'6; 580 lin. ft. base; 580 lin. ft. base shoe; 580 lin. ft. base molding; 30 lin. ft. closet shelving; 30 lin. ft. closet hook strip; 284 lin. ft. picture molding; 68 lin. ft. ceiling cove; 20 lin. ft. clothes rod; 10 lin. ft. threshold; 28 lin. ft. band molding. **Note:** If living and dining room and hall trim is changed, it will affect the following items: 2 doors 2'0x7'0-1¾ (No. 1600); 1 side trim 4'0x7'0; 1 astragal 7'0; 1 dr. 3'0x7'0-1¾ (No. 1246); 1 side trim 3'0x7'0; 1 dr. 2'8x7'0-1¾ (No. 1102); 1 jamb 2'8x7'0; 2 side trim 2'8x7'0; 2 doors 2'6x7'0-1¾ (No. 1102); 2 jambs 2'6x7'0; 2 side trim 2'6x7'0; 1 flight main stairs; 1 mantel shelf; 2 bookcases; 2 sides single wd. trim 10x12-16L; 1 side single wd. trim 10x12-12L; 1 side mul. wd. trim 10x12-12L; 150 lin. ft. base; 150 lin. ft. base shoe; 150 lin. ft. base molding; 150 lin. ft. picture molding; 68 lin. ft. ceiling cove; 630 ft. 13/16x1½ finish flooring.
INSULATION—3 rolls felt floors; 5 rolls felt walls; 4 rolls felt roof; 800 ft. ½-in. vegetable insulation or equal for ceiling; 1900 ft. ½-in. vegetable insulation or equal for walls.
TINWORK—18 lin. ft. ridge roll; 2 finials; 72 lin. ft. hip roll; 20 sq. ft. tin deck; 14 lin. ft. chimney flashing; 150 lin. ft. gutter; 35 gutter hangers; 4 outside miters; 2 gutter ends; 5 strainers; 5 nipples; 5 offsets; 5 elbows; 5 shut-offs; 92 lin. ft. conductor; 15 conductor hooks; 30 lin. ft. flashing tin; 200 tin shingles.
WEATHER STRIPPING—5 cellar sash 8x10-3L; 1 wd. 10x16-4L; 2—10x12-16L; 6—10x12-4L; 2—8x10-8L; 3—8x10-12L; 2 sh. 8x10-3L; 2—8x 10-6L; 6 wds. 10x12-8L; 1—10x12-12L; 1 sh. 10x12-3L; 2 doors 2'0x7'0; 1—3'0x7'0; 1—2'8x7'0.
CAULKING—14 single frames; 8 mullion frames; 1 double door frame; 2 single door frames; 1 icing door frame; 1 coal chute.
REINFORCING STEEL—36—⅜ rods-10'0; 20—½ rods-18'0.
HARDWARE—5 cellar sash sets; 21 sash locks; 21 sash lifts; 4 casement sash sets; 1 transom set; 31 storm sash sets; 31 screen sets; 10 sets shutter hardware for pairs; 6 sets shutter hardware for singles; 1 double door set with butts; 2 single door set with butts; 1 icing door set with butts; 1 set screen hardware for pair of doors; 1 set st. dr. hardware for pair of doors; 2 sets storm door hardware for single doors; 2 sets screen door hardware for single doors; 1 floor hinge; 2 push plates; 21 inside door sets with butts; 26 door bumpers; 4 doz. clothes hooks; 4 stair rail brackets; 1200 lb. assorted nails; 6 lb. assorted brads; 1 coal chute; 615 lb. sash weights; 5 hanks sash cord; 1 pr. hinges for scuttle door; 4 friction stays for utility door; for medicine cabinet: 1 cupboard turn, 1 pr. ornamental butts; 2 pr. hinges for seat covers; for kitchen cabinets: 10 pr. ornamental butts, 5 cupboard turns, 5 elbow catches, 4 drawer pulls, 1 set castors; for worktable: 1 bin pull, 1 pr. ornamental butts, 1 cupboard turn, 2 drawer pulls; for refrigerator cabinet: 2 pr. ornamental butts. 1 cupboard turn, 1 elbow catch; for electric cabinet: 1 pr. ornamental butts, 1 cupboard turn; for bookcases: 2 cupboard turns, 2 pr. ornamental butts.
EXTERIOR PAINTING—16 gal. body paint; 6 gal. trim paint; 3 gal. boiled oil; 40 gal. shingle stain; ½ gal. porch floor paint; 1 gal. screen paint; 1 gal. sash color; ½ gal. shutter color; ½ gal. shellac; 1 gal. japan; 10 lb. putty.
INTERIOR PAINTING—12 gal. white paint; 7 gal. enamel; 6 gal. filler stain; 3 gal. shellac; 11 gal. interior varnish; 4 gal. floor shellac; 6 gal. floor varnish; 2 gal. oil; 1 gal. turpentine; 1 gal. japan; 1 gal. alcohol; 4 lb. steel wool.



ELEV. OF BED ROOM No 205
Scale ½"=1'-0"



SECTION

SCHEDULE OF WINDOWS

Quant.	Type	Description	No. Lights	Size of Glass	Size of Opng. for Sash	Thickness of Sash	Frame
5	1	Hinged Sash	3	8x10	2'-4 x 1'-3"	1⅜"	See Detail
1	2	Dbl. Hung	4	10"x16"	2'-1" x 3'-2	1⅜	" "
2	3	"	16	10"x12"	3'-8½ x 4'-6"	"	" "
9	4	"	12	10"x12"	2'-11½ x 4'-6"	"	" "
2	5	"	8	8"x10"	1'-9" x 3'-10"	"	" "
3	6	"	12	8"x10"	2'-4½ x 3'-10"	"	" "
1	7	Casement	3	"	2'-10" x 3'-0	1¾	" "
2	8	"	6	"	1'-9" x 3'-0	"	" "
6	9	Dbl. Hung	8	10"x12"	2'-1" x 4'-6"	1⅜	" "
1	10	"	12	"	2'-10½ x 4'-6"	"	" "
1	11	Transom	3	"	2'-10½ x 1'-5	"	" "

SCHEDULE OF DOORS

Quant.	Type	Sizes	Description	Remarks
1	A	2'-8"x6'-6"x1⅜	#720 Pine	3 Panel
2	B	2'-0"x7'-0"x1¾	#1600 Oak	10 lts 2 Sq. Gl.
1	C	3'-0"x7'-0"x1¾	#1246 "	Glass Pl. Gl.
2	D	2'-8"x7'-0"x1⅜	#1102 Birch	2 Panels
1	E	2'-8"x7'-0"x1¾	#970 Pine	11 lt. Sq. Gl.
13	F	2'-6"x7'-0"x1⅜	#1102 Birch	2 Panels
4	G	2'-6"x6'-10"x1⅜	" "	"
7	H	2'-4"x6'-10"x1⅜	" "	"
1	J	1'-6"x6'-10"x1⅜	" "	"
1	K	1'-4"x6'-0"x1⅜	" "	"
1	L	1'-6"x2'-0"x1⅜	Special	1 Panel
1	M	2'-6"x7'-0"x1⅜	#1312 Birch	11 lt. Sq. Gl.

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Details, door and window schedules and quantity survey for House No. 6A53, especially designed for National Builder by the Lake division of The Architects' Small House Service Bureau of the United States, Inc.

A Small Well-Planned Church of Mission Style

By Charles Alma Byers

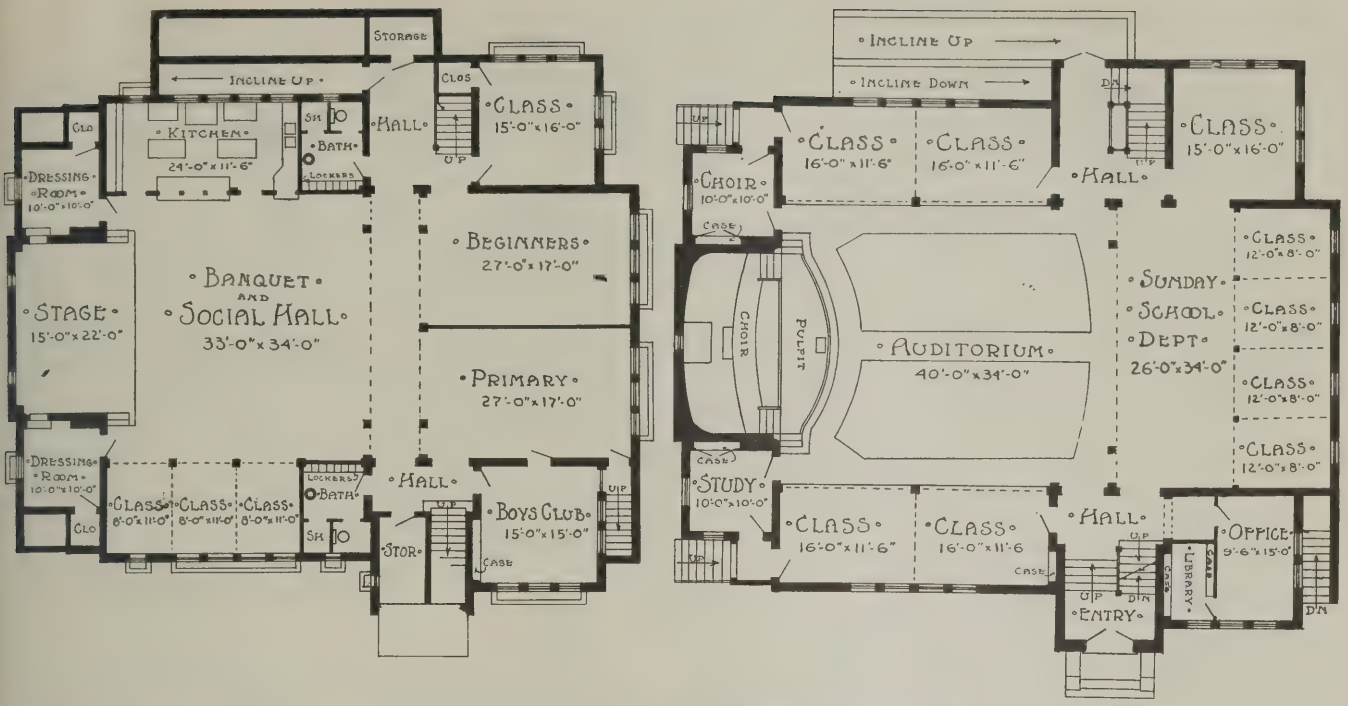
THE demands made upon the church edifice of today are many and quite exacting. That it be merely given over more or less wholly to a large, general purpose auditorium, as it once was, will no longer suffice. It must also possess, if it is to be up-to-date, special provisions for the greatly increased work of the Sunday School, for the activities of the various church societies, and for the occasional holding of purely social affairs. Present day church building designing, even as regards the small church, therefore requires somewhat exceptional study.

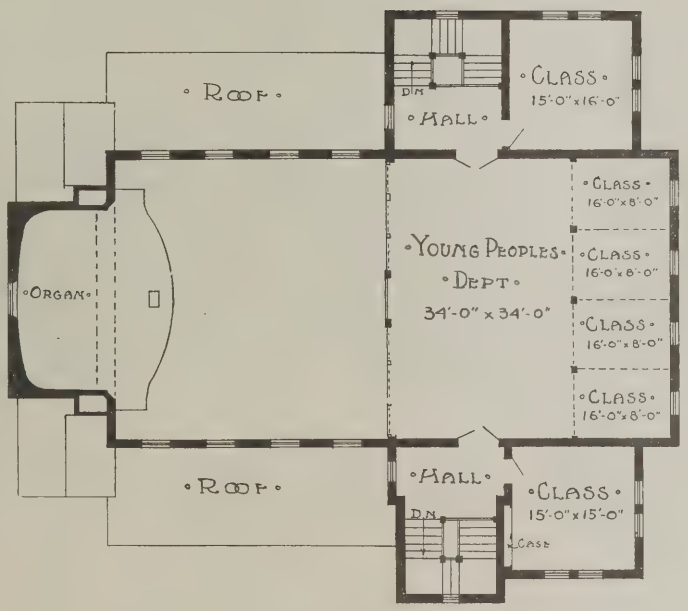
The comparatively small church building illustrated here is especially modern and complete in exterior design and interior arrangement. Including the basement, it possesses, as will be seen, three very excellently developed floor plans, which combine to provide facilities for nearly every purpose that can be desired. In the basement, for instance, are a large banquet and social hall, a stage for entertainment use, two small dressing rooms, two bathrooms, a well-equipped kitchen, a boys' clubroom, and three large and three small classrooms, besides a number of closets and built-in features; on the main floor are the church auditorium, choir room and loft, pastor's study, secretary's office, library, and a total of nine small classrooms, besides the main Sunday School room, and on the second floor are the pipe-organ loft and the young people's department, as well as six more separate classrooms.

The seating capacities of the principal divisions are as follows: Main auditorium, 176; choir loft, 30; Sunday School department, 90; balcony portion of the young people's department, 90—a total of 386 within

WELL meaning but uninformed church building committees often add very little to the architectural beauty of their communities in the church buildings which they construct. There is every reason why the church house should be one of the most beautiful buildings in its locality. A most delightful style is found in the Mission type. It is a very appropriate one, too, for the ecclesiastical building, since Mission architecture, as the term indicates, is of religious origin and its simplicity and dignity are a suitable expression of the religious ideals of any creed.—The Editor.

A church in the Mission style in Artesia, Calif. Arthur G. Lindley, architect. It is of frame construction with the exterior walls finished with stucco and painted white. The wood trim is done in pearl gray and the roof tile are red. The foundation and basement walls are concrete





In the basement of the church are a large banquet and social hall, a stage for entertainment use, two small dressing rooms, two bathrooms with lockers, a well-equipped kitchen, a boys' clubroom, and three large and three small classrooms, besides a number of closets and built-in features. On the main floor are the church auditorium, choir room and loft, pastor's study, secretary's office, library, and a total of nine small classrooms, besides the main Sunday School room, and on the second floor are the pipe organ loft and the young people's department, as well as six more separate classrooms.

The seating capacities of the principal rooms are: Main auditorium, 176; choir loft, 30; Sunday School department, 90; balcony portion of the young people's department, 90—a total of 386 within sight and hearing of the pulpit. The banquet and social hall in the basement will seat about 350 during a program entertainment or 250 at banquet tables. The interior woodwork is of Oregon fir finished throughout in oak stain, except in the kitchen, which is done in white enamel. All walls are plastered and tinted, and the floors are of pine, except in the basement, which is floored with cement.

sight and hearing of the pulpit. The banquet and social hall in the basement is capable of accommodating about 350 during a program entertainment, or will seat 250 at banquet tables. The floor dimensions of the various small classrooms, as well as of all other divisions, will be found indicated in the plans.

The building is designed after the Mission style of architecture, and presents an unusually attractive outside appearance. It is of frame construction, with the exterior walls finished with cement stucco and painted white. The slight wood trimming, confined mainly to the window frames, is done in pearl gray, and the roof covering consists of red roofing tile. The foundation, including the walls of the basement, is of concrete, and all windows of the main and second floors are comprised of art glass.

The interior woodwork consists of Oregon fir, finished throughout in oak stain, except in the kitchen, which is done in white enamel. All walls, including those of the basement, are plastered and tinted, and the floors of the first and second stories are of pine, while the basement is floored with cement. The pews are comprised of natural oak, and the pulpit is finished natural and furnished to match. The heating system consists of gas radiators, operated on the unit plan, and the equipment also includes a modern ventilation system.

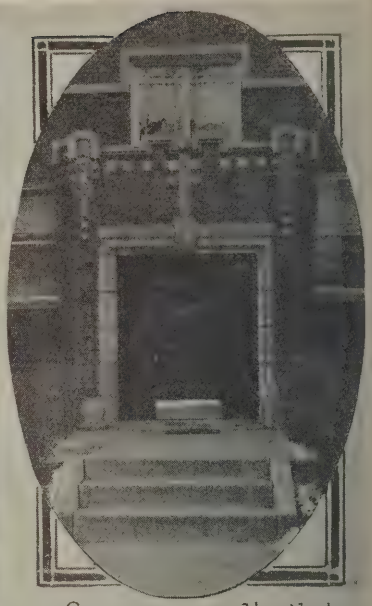
This church is located in the small city of Artesia, Calif., and was designed by Arthur G. Lindley, a specialist in church architecture, of Los Angeles. It was built a little over a year ago, at a total cost of about $35,000, exclusive of the pipe organ, pews and other equipment. It is the home of the First Methodist Episcopal Church of its city.

Creosote From Chimneys

BUILDERS are occasionally called upon to explain why it is that a black, tarry substance is staining the chimney walls or is leaking out at points in the chimney. This strong smelling, tarry substance, is a product of condensation within the chimney, resulting from the cooling of the air column as it ascends. If the ascending columns of gases can be kept warm enough the material will pass off as a vapor, but when cooled by the admission of air or the too close choking of the draft, it condenses within the pipe and drips back. The condition can be checked or lessened by seeing that the chimney passage is unobstructed; by making the chimney tight, preventing air from entering except through the pipe, and by running the stove or furnace so that a little more heat is permitted to escape up the chimney.

Inviting Apartment House Entrances

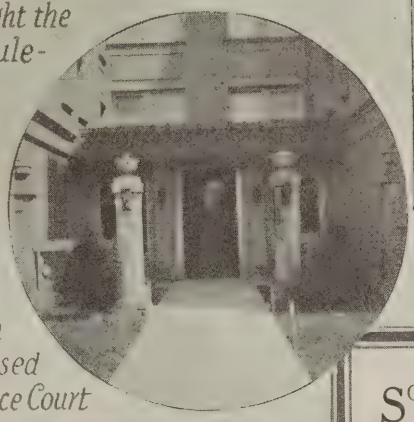
Terra cotta permits the use of Ornament



Entrance and Vestibule are built-out

Casements help light the Vestibule

Indiana limestone for the English basement apartment described elsewhere in this issue. Small panes in doors and windows add interest to the openings



An enclosed Entrance Court

A slight arch adds Grace to the opening

SOMEWHERE there must be a happy medium between "beware the dog" aspect of many a forbidding apartment house entrance and the hospitable appearance of the entrance that invites. It is that character or feeling that the builder or architect of apartment houses should strive to achieve in his entrances. If an entrance is too cold and austere, it will repel the prospective tenant who is looking for a home as well as a shelter; if it is too easy of access and too open to the public, tenants will be annoyed by uninvited callers. A few examples of apartment house entrances of various types are shown on this page.

It is a common mistake to use too much ornament on the entrance. An excess of concrete or terra cotta forms or an overdisplay of brick patterns should be avoided. Note, for example, the simplicity of the entrance shown in the center of the above group. It is from the Hinman and Lee apartment house in Evanston, Ill., which was designed by L. G. Hallberg & Co. and is described in this issue. Small panes of glass in the entrance door are usually desirable because of the interest they contribute to the opening. Sidelights add breadth to the entrance, and this, too, is good, for the apartment house vestibule is usually a large one and will permit a wide opening; furthermore, the additional light makes a brighter hall. To gain this end, the entrance shown in the oval in upper left hand corner employs casement sash.

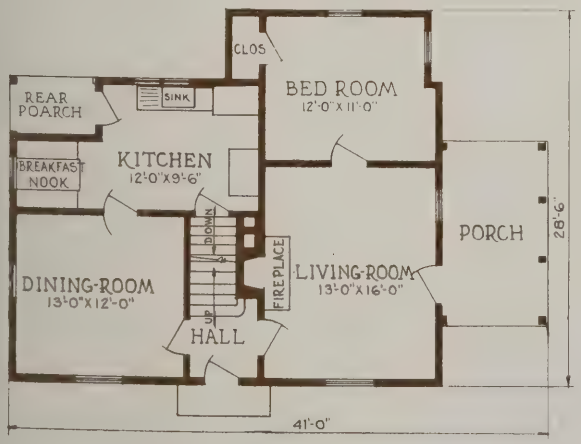
Suggestions for treatment of the entrance that is not within the main walls of the building are shown in the circular illustration and in the upper right hand corner. Here the entrances are unusually prominent. Just as in the case of the single house, when the entrance of the apartment house is level with the sidewalk or only a step or two up, it seems so much more inviting, and when unlighted at night it is safer for the outgoing stranger.

Close attention paid to the design of the apartment house entrance by the architect and builder, before the house is built, will tend to assure more satisfactory results in the end.

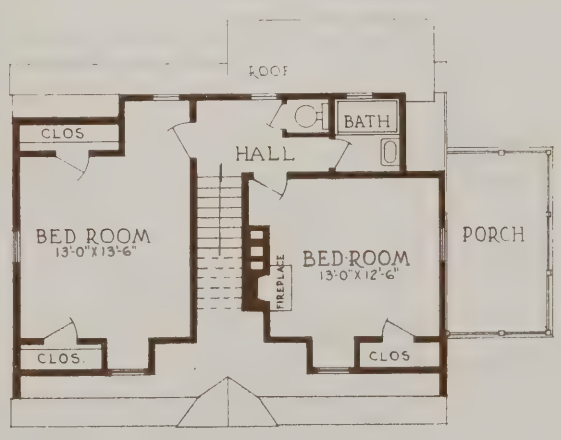
National Builder 'STYLE SHEET

A Little House in Knoxville, Tenn., That Is Worth Studying

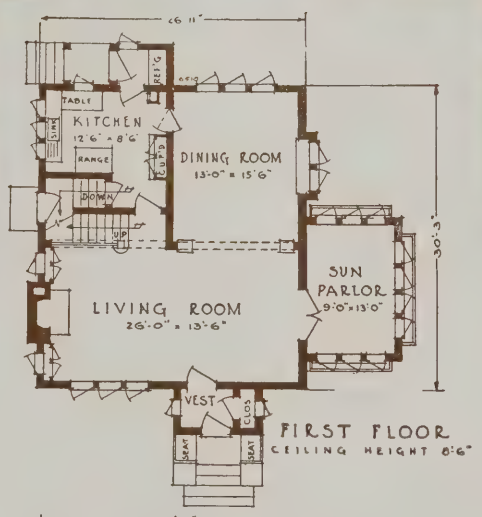
THIS beautiful little Colonial home is one of the group by Barber & McMurray, architects, in Knoxville, Tenn., whose work is described on pages 23-25 in this issue. Both design and plan will repay careful study. Here is a gambrel roof house where the break in the roof is *right* and the overhang on both the gables and at the second floor line is properly handled. Note, too, the delightful detail of the entrance stoop. Wide shingle courses make an interesting exterior wall. The big chimney, with its pots, introduces a color note in contrast to walls and roof. The plan is excellent.

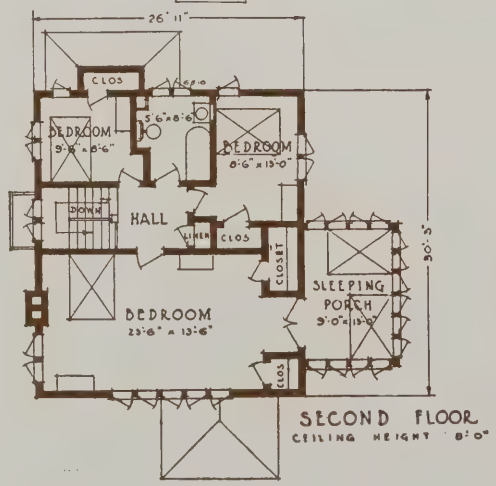


FIRST FLOOR PLAN



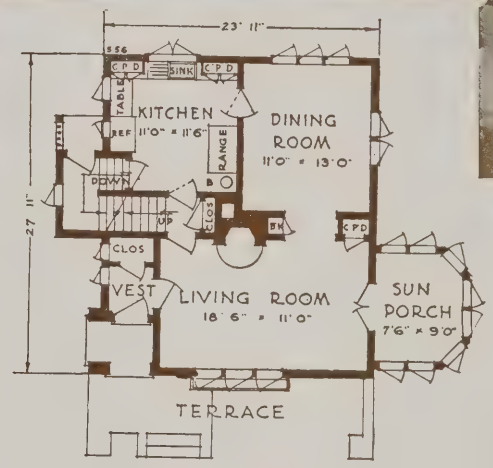
SECOND FLOOR PLAN



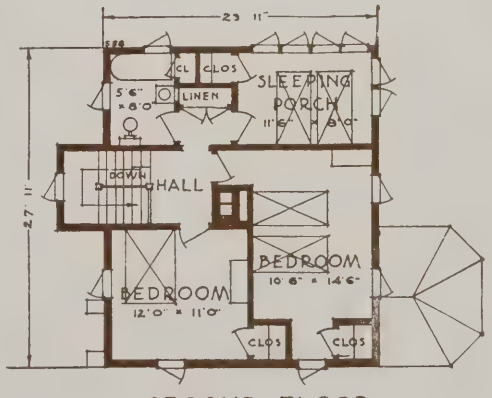


Two Stucco Houses with Roofs of Spanish Tile

The house on this and the opposite page are an interesting study in designing and planning. They have both been built from plans furnished by The Architects' Small House Service Bureau, such as NATIONAL BUILDER publishes in each issue. They show a judicious use of a wide overhang on the roofs, by means of open cornices, which prevent the tile from seemingly weighing down the house, as it invariably does when incorrectly used. The plan of the house on this page shows also a good treatment of the sunparlor-sleeping porch addition. These two members do not appear as a built-on after-thought, but are made an integral part of the house itself. The entrance settle is as useful, on occasions, as it is inviting, and the wide roof over the entrance protects the door against the weather. Casements with divided lights are used throughout the house, and they are well spaced.



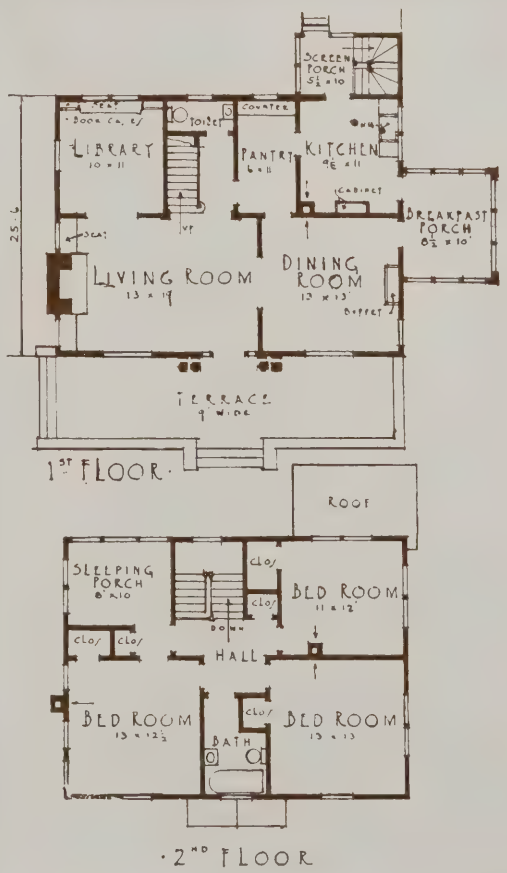
FIRST FLOOR
CEILING HEIGHT 8'6"



SECOND FLOOR
CEILING HEIGHT 8' 0"

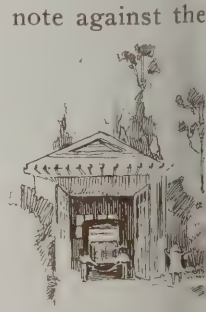
An Interesting Study in Designing and Planning

This plan is of the same basic layout as the one on the page opposite, yet is entirely different in the effect produced. Here the living room gives up some space to the entrance porch and vestibule, which are within the main walls of the house. The stairway is enclosed. Upstairs the sleeping porch is not over the sun parlor but is accessible from both bedrooms. This house is about three feet smaller each way than the one opposite. The foundation is attractively treated and adds a desirable color note to the exterior. Note the balancing of the arched opening to the entrance with a curved trellis on the other corner of the main facade. Concrete flower pots are ornaments in themselves in addition to their colorful contents. Little things such as these make a house attractive and therefore help to sell or rent it, if built for that purpose, and add value to it if built for the owner.



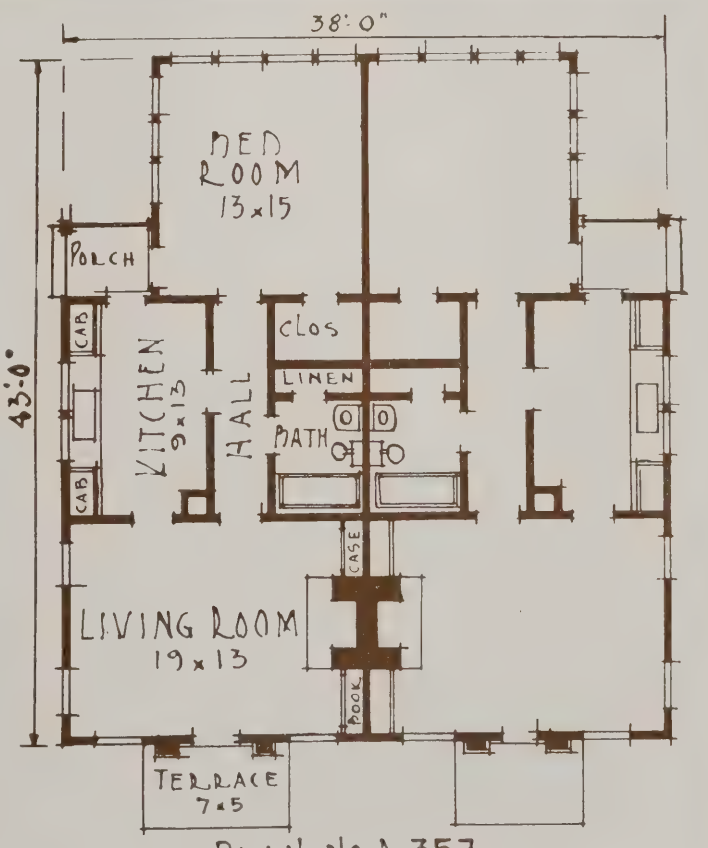
A Square House That Is "Different" and Not Like a Box

One of the most practical of all plans is that of the square house, because it is the most economical to build, having less wall space per square foot of floor space than the long, narrow house. Furthermore, a convenient arrangement of rooms without any waste space is usually possible in the square house. On the other hand, it so frequently happens that the square house when actually built looks like just a big box. It is without character and looks the part to the passerby. This need not be the case, however. There is no reason why the square house cannot look well in addition to having a good plan. Here, for example, is a design which suggests a good treatment of any house of similar proportions. Note the entrance porch and doorway and what these details contribute to the beauty of the place. The blinds on the windows are a contrasting color note against the white siding. Small panes have been used in the windows and the French doors leading to the terrace, and they make interesting openings. The little garage in the back carries out the general design of the house and is conveniently situated for the use of the car. The vines and shrubs are a feature that cost very little yet add a great deal to the appearance of the house.



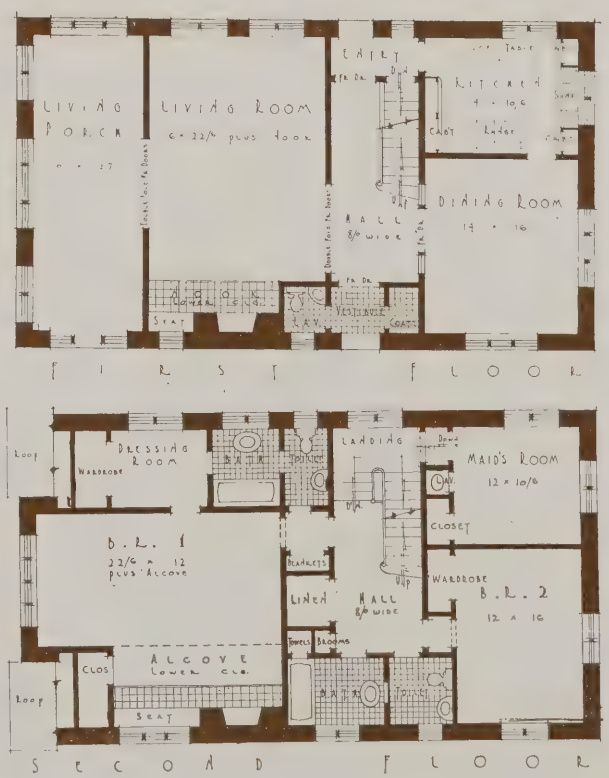
A Double House with Three Rooms on Each Side

Here is something unique in a two-family semi-detached or "double" house. Each side has only three rooms. It is just the house to build for the transient tenant, for newlyweds or for couples whose children have grown and left "the old nest." What small family would not prefer living in this little cottage to a flat or apartment? Building two little houses together like this has its advantages from an architectural standpoint. It makes possible long, horizontal lines, which always give a house a restful, attractive appearance. The hoods over the doorways of this house are a little too heavy for the best effect, but the idea is good. Note that the plan shows how a fireplace might be built into each apartment if desired. A dining nook might be incorporated into the back porch if preferred, or the space now occupied by the closets in the bathroom and bedroom made into a dining nook.



PLAN N° R-353

A House Built at Rye, New York, with Sketch of Floor Plans as Suggested by National Builder



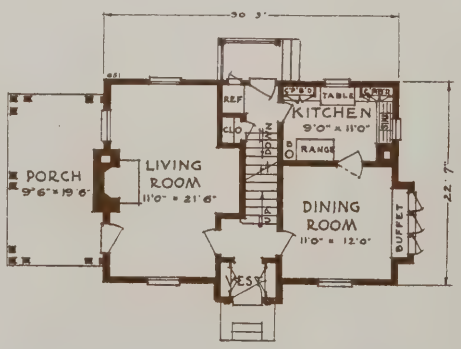
This beautiful residence is in Rye, New York, architect or builder not known, so NATIONAL BUILDER ventures to suggest a possible layout for the floor plans. The windows and doorways are so located as to permit a most conveniently arranged interior embodying a lavatory off the front vestibule, as well as a coat closet, and a central hallway leading to an entry in the rear which might be used as a carriage entrance. Note the deightful inglenook, with tile floor, provided in the living room, and the huge living porch. Upstairs there are two bathrooms, each with a separate toilet, two splendid master's bedrooms and a good-sized maid's room. In suggesting this layout, fewer, but larger bedrooms are recommended rather than more and smaller chambers, but this is a matter entirely in the discretion of the prospective owner and is governed by the size of his family. Then, too, this house need not be built so large as the plan indicates. Nor need it be built of stone as shown in the picture. The design is so good that the house would look well in any size and in any material.

A Colonial House with Servants' Quarters. Floor Plans Suggested by National Builder

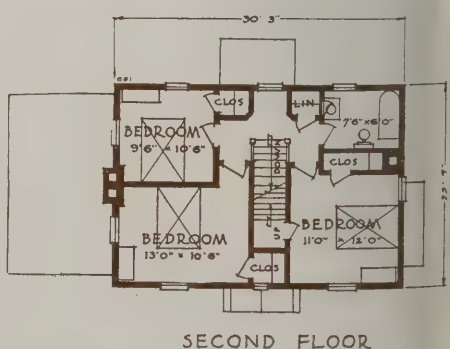
A Colonial house with a lean-to or a built-on addition is not at all uncommon. This design typifies that style of house and the plans, suggested by NATIONAL BUILDER, show how the addition is divided into a servants' bedroom and bath separated from the kitchen by a pantry, which connects the kitchen with the dining room. This plan has the characteristic central hall of the Colonial house. Note the rear entrance — a carriage entrance, perhaps — and the lavatory which occupies the space beneath the stairway. This stairway is worthy of study, for it is an impressive feature of the interior. When there are four bedrooms there ought always to be two bathrooms, as shown here. Note, too, that each of these rooms has cross-corner ventilation and light, which should make them cool in summer and bright in winter. This house can be built smaller than indicated, if desired.

Built in Topeka, Kan., from Plans by The Architects' Small House Service Bureau

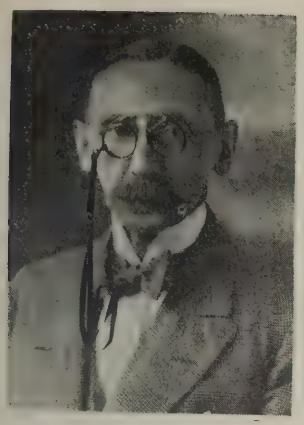
READERS of NATIONAL BUILDER know the advantages of working from small house plans that are carefully drawn and completely detailed. Many such plans have been published in their entirety in this journal. The group of plans by the Architects' Small House Service Bureal which has appeared in each issue have been especially valuable as examples of what good plans are like. The practical character of the plans furnished by this organization is shown with striking effect in the house illustrated on this page. On the right is a reproduction (very much reduced) of the artist's drawing of the house as it appeared in the book, "How to Plan, Finance and Build Your Home," published by the Architects' Small House Service Bureau, Inc. Above is a reproduction of a photograph of the house as it was actually built from the plans. The builder who follows the plans will get equally good results every time. When shrubs and grass have grown on the now bare lot, this little house will be a charming home, a credit to the good taste of its owner and a testimonial to the craftsmanship of its builder. It sets a good example for its neighbors and should encourage the building of many other houses equally beautiful.



FIRST FLOOR
CEILING HEIGHT 8' 4"



SECOND FLOOR
CEILING HEIGHT 8' 0"



Edward Stratton Holloway

Not long ago National Builder sent out a questionnaire to all its readers asking them on what subjects they would like to see articles run in this journal. Very close to the top of the list of those subjects receiving the most votes was Interior Decoration. This was, in a way, a surprise, for offhand one would hardly suspect the contractor or builder of having any interest in this subject, which is ordinarily associated with the interests of women or men of less husky aspect than builders. On the other hand, the straw vote of this questionnaire is, after all, in keeping with recent developments in the building industry. Builders are awakening to the fact that lumber and concrete are not alone what sells the house or gets the contract, but rather attractiveness and homelike quality and the builder who gets these elements into his houses or apartments is the one who does the biggest business or who secures the profitable contracts.

Who should write these articles was the question to be answered. From a personal acquaintance with both the man and his work, we felt there was no one better qualified to write about interior decoration for contractors and builders than Mr. Edward Stratton Holloway, whose photograph appears above.

Mr. Holloway studied at the Pennsylvania Academy of the Fine Arts and became a marine and landscape painter and decorative artist. He is Art Director for the J. B. Lippincott Company, publishers, Philadelphia, planning and carrying out their high-class publications and designing hundreds of covers, decorations, title pages, etc. Sixteen years ago he began to add to his knowledge of interior decoration, furniture, and architecture by a close study of these subjects. This being originally commenced to supply his own decorative needs, he has never forgotten the various points which the household furnisher requires to know. Wishing to aid others, he has contributed many articles to such journals as "House Beautiful" and "Good Furniture," is joint author of "The Practical Book of Interior Decoration," and within the year his publishers have brought out "The Practical Book of Furnishing the Small House and Apartment," of which he is sole author and which is recognized by all authorities as a valuable contribution to the literature of a much neglected field.

Nothing gives us greater satisfaction than to present Mr. Holloway to our readers, for we feel that his articles will be of incalculable value to all who read them and follow his suggestions.—The Editor.

Attractiveness Sells the House

How Good Business and Good Design in Building Should Go Hand in Hand. A Few Examples of Houses and Interiors That Are Beautiful and What Makes Them So

By Edward Stratton Holloway
Author of "The Practical Book of Furnishing the Small House and Apartment"

THE present writer is too much the business-man ever to forget that the primary purpose of business is to make money—to provide a competency for one's self and family. It is perfectly recognized by us all that if a certain building must be designed and erected so as to cost the client or the purchaser a stated figure, the initial expense may not exceed a certain proportion of that sum.

But to this dictum we may add two other propositions: The business-man should have some fun out of his business—he should find enjoyment in it as he proceeds; and that enjoyment will be heightened by the thought that by it all he is benefiting his fellow Americans. Let us realize, then, that ideals are entirely compatible with business; that if the initial cost must be limited to a certain amount, it is a more entertaining *game* to see how *much* can be given for the money rather than how little, to plume ourselves on the attractiveness and the quality we are able to furnish for so small an amount, to outdo our compeers and build up a reputation for honor and for art. If, however, we must still be utilitarian, we may, even then, supplement the old adage of honesty being the best policy by the further one that it is attractiveness that sells the house! To aid the building operator and the contractor in securing that attractiveness is the aim of the present and future articles.

In securing the results he would *like* to obtain, the producer is hampered not only by considerations of cost. Rather than debating in his mind what architectural style he shall adopt, the builder is most likely to remember that he must wrestle with a number of existing conditions. The house, or other building, must be erected on a given location—and look well in its position; the exigencies of our trying climate must be reckoned with; the choice of material is limited by circumstances; labor is expensive and at best unsatisfactory; the comfort of the occupants should be regarded as a *sine quo non;* and the house must be planned for convenience and healthfulness. Quite a "bunch" of conditions to be met! From beginning to bitter end the producer is hampered by necessary existing circumstances. *So much the better!* And why? Out of the meeting of those special local American conditions we are—almost "unbeknownst" to ourselves—evolving a genuine American domestic architecture. "The residence"—abominable term!—may be French Chateau, Italian, Spanish, Elizabethean, or what not; the small house is becoming more and more distinctly American! Arising out of and successfully meeting indigenous circumstances it becomes itself indigenous; all good architecture and decoration so arrive. And consider the fun of beating the devil of necessity at his own game!

But the man who neglects all that those of

Fig. 1—A "dry goods box" becomes a charming house when in skilful hands. De Armand, Ashmead & Bickley, Architects, Philadelphia

the past have done is—unwise. We may not forget what the centuries have taught us; how others have met the conditions they were forced to face. While, therefore, we may for the moment put out of mind the period styles of the various nations, we shall soon return to them at least for reference and the precedent they afford.

The Concrete Example

There is nothing like being practical. We have a small house to build; it must be erected on a plot of ground of limited ex-

We may turn for a moment to that simplest and most inexpensive form of home, the bungalow. While there are thousands of good examples to be seen, there are other thousands that are simply an excrescence upon the face of the earth. Fig. 2 is excellent because of its frank recognition of limitations and its proportions. Unnecessary ornament is strictly avoided and it wins attractiveness through its general good sense of form. An interior in this dwelling will appear later on.

The plan of these articles is to show some

some relief is given to the rectangle by th slight advancing of the central portion an by the gable end. It would be rendered muc more attractive by shrubbery and vines. A the artist in his picture minimizes the lon hard line by "finding and losing," so ma the extensive unbroken base of a buildin be relieved by the aid of greenery.

There are various ways of attaining th picturesque which is so often desirable dwellings, and of which Figs. 5 and 7 a examples. No. 5 illustrates an attracti little home with cheerful, inviting qualitie

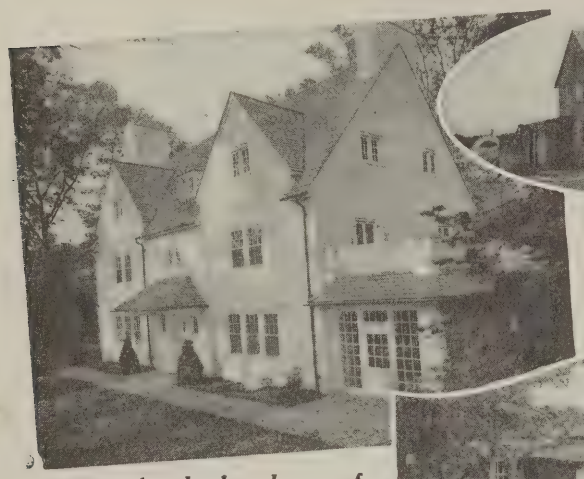


Fig. 3—A suburban house of much distinction at Germantown, Pa.

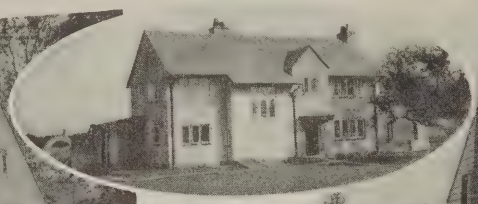


Fig. 4—Simple but ornamental

Fig. 5—A small home-like house at Jenkintown, Pa.

Fig. 2—A well-proportioned bungalow at Toms River, N. J. Heacock & Hohanson, Architects, Philadelphia

Fig. 6—A gambrel roof house at Pine Valley, N. J. Frank A. Hays, Architect, Philadelphia

Fig. 7—Picturesque qualities gained by the slanting r and grouped chimneys in this house at Wynwyd, Edward B. Delk, Architect, Philadelphia

tent; its cost must not exceed a certain figure. However picturesque in itself a rambling house may be, we well know that this location will not admit of such a dwelling, and that, if it did, in order to come within the limit of cost the house must be compactly planned—in short, we must erect a dry-goods box! Very well; it is not by any means the first time that such necessities have required the facing. At certain periods of the world's history the rectangle was the *chosen* form, for it embodies the classical conception. Fig. 1 shows what one firm of architects made of the dry-goods box! This house was built in, I think, 1916, and then cost the owner about $6500. Its ancestry is of course Georgian, but in its totality it is an American house. It is also individual and charming.

examples of what is actually being done by excellent architects and decorators, adding helpful suggestions and comments, with the view not that those houses and interiors shall be reproduced but that they may afford the builder ideas which he may *adapt* to his own practice, with much simplification if necessary. More expensive homes than some builders are likely to erect are therefore shown without hesitation *because* they illustrate ideas that are available for smaller properties.

In Fig 3 we have a distinctively individual house with most attractively arranged doorway and windows to the sun parlor and railed platform porch above, and with a large hood over the main door.

No. 4 is one of these larger houses, also individual and of much simplicity. In this,

Notwithstanding its sloping roof, note provision for airiness in the upper floor fact all these houses, with their range windows, show that their designers had our trying climate well in mind. large chimney and the combination of terials are both excellent. A caution be given that the pergola has been a deal done, and the writer would have ferred a roofed porch.

Fig. 7 is again a larger house, shown its picturesque quality gained by the slanting roof and grouped chimneys. simple, arched doorway with its suspe lantern is also notably good.

The gambrel-roofed house (Fig. 6) a distinctively different type from hitherto presented and its homelike qua are at once evident.

Fig. 8—The admirable qualities of restrained, good design. Mrs. Emma S. Brown, Interior Decorator, Philadelphia

Fig. 9—The furnishing qualities of the intelligently handled simple interior. Mrs. Emma S. Brown, Interior Decorator, Philadelphia

Adaptability to Location

Every building when completed should look as if it had *grown* and as if it belonged where it is. Restlessness and flightiness have injured the disposal of numerous properties otherwise desirable; the possible purchaser may not perceive precisely what it is that disturbs him, but he realizes that something is wrong, and passes on. There are exceptions, but as a general principle it may be said that if a house is to be homelike it is well to keep it *low to the ground.*

Color

As color has come into its own in the furnishing of the house, so a greater use may well be made of it in the enhancing of the attractiveness of the exterior. In both cases it should be used with discrimination, the result being harmonious either by likeness or contrast. A case of disharmony is the hard shade of strong or bluish green often employed for stained shingle roofs. It is green, but it is like none of nature's hues and it is discordant with them. Far better would be silver or dark grey, buffs or wood-browns, or the contrasting color of red. A small home embowered in foliage might well be of white or cream stucco with yellow ocher trim and roof.

Colored tile or medallions in connection with stucco or concrete, or some bricks, give originality and charm when used with discretion.

There is no particular reason why doors should so universally be white, or green, or of natural wood. Blue is now quite frequently used, and in some individual developments red, yellow, or violet also appear. Ironwork of glossy black employed in small balconies, window-railings, and the like, affords a strong and pleasing contrast to light materials and to brickwork.

The Interior

The interior of any house should be attractive though as yet it does not contain a stick of furniture. Happily the day of foolish grilles, over-elaborate newel-posts, bad

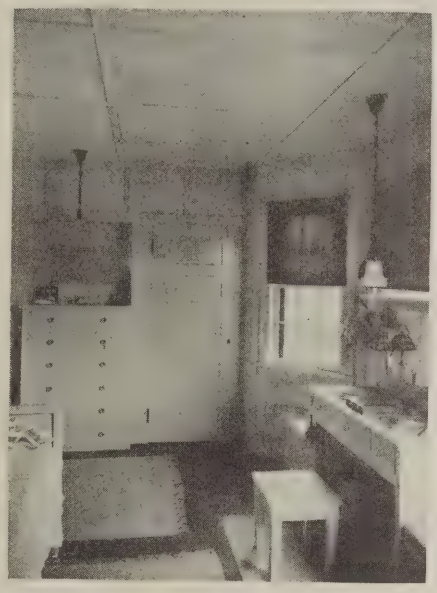


Fig. 10—A bungalow bedroom with built-in fitments. Heacock & Hohanson, Architects, Philadelphia

mantels, and undue ornamentation generally, is practically over in civilized portions of our country, and the universal demand is for tasteful interiors that will furnish well. Simplicity is never an objection, but it should be an interesting and not drab and ordinary simplicity.

Standardized materials must be used, but, as an accomplished dressmaker could make a ten-cent calico into a smart-looking frock of its kind, so a clever builder may secure excellent results with what is at his disposal. Lack of space prevents more than a few hints. Fig. 8 shows a specially designed interior adapted to simplification. An even plainer overmantel might be carried out by the use of moldings applied directly to the wall. In a house of about 1790, in a historic location in Pennsylvania, there is a simple white molding carried around the wall at window-sill height; it gives a wainscoat effect although white plaster (uncalcimined) appears between it and the baseboard as well as above the molding.

A fairly heavy but extremely simple cornice in addition to the baseboard gives a good result in Fig. 9 with the plain wall surface. The desirability of triple windows, especially when recessed, as in this instance, has been referred to, and it is emphasized by the excellent curtaining of this attractive interior.

The bungalow bedroom (Fig. 10) with built-in dressing table and chest of drawers will afford hints to the builder.

The present article is necessarily suggestive rather than full. Subsequent ones will afford greater detail. If the builder is stimulated to give careful advance study to the possibilities of each individual house he erects the writer's aim will have been accomplished.

Starved Glue Joints

MANY failures in glued-up wood are caused by "starved" joints, or joints in which the film of glue between the wood surfaces is not continuous. Such joints, according to the Forest Products Laboratory, Madison, Wis., are not necessarily the result of a lack of glue spread on the wood; heavy spreads are as likely to produce them under ordinary commercial conditions as light spreads. They are caused rather by the application of pressure to the joint while the glue is too fluid. Some woods are more susceptible to the production of starved joints than others.

Starved joints are more likely to occur with glues of low viscosity, such as warm animal glue and most blood albumin glues, than with casein, vegetable and other thick glues.

To avoid starved joints it is necessary to mix a glue solution thick or allow it to thicken on the wood from drying or chilling before pressure is applied. When it is necessary to glue under conditions which might produce starved joints, the use of light pressure is advantageous.

Combination Store, Office and Apartment Building

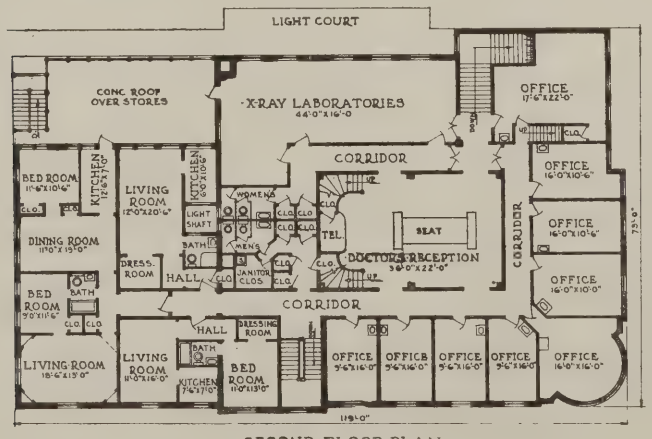
THE building illustrated here is known as the Mirador Building and is located at Crawford avenue and Jackson boulevard in Chicago, Ill. It is owned by the Lambert Tree estate and was erected at a cost of about $130,000.

of the second floor, which is designed to provide living quarters for a few of the professional men who occupy offices in the building.

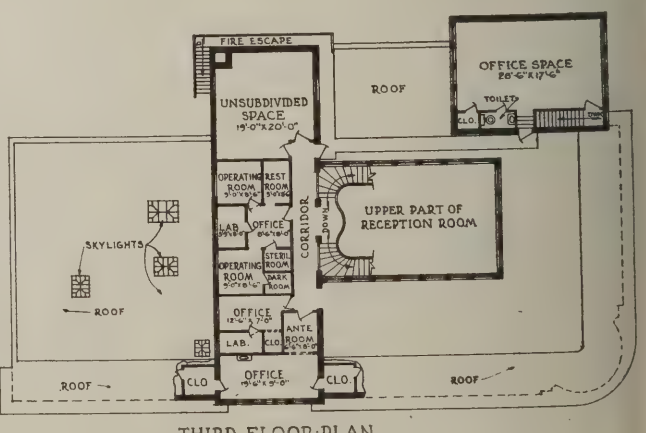
The front is built of red face brick with ornamental cut stone trim and the mansard

kind which are now under course of co
struction in Chicago. Notice especially t
massive stone entrance, the heavy copp
cornice and the ornamental lighting fixtur

Fireproof construction was used throug
out except in the roof, which is of the us



SECOND FLOOR PLAN



THIRD FLOOR PLAN

The lower floor is given over to space occupied by retail stores and the two upper floors are devoted to medical and dental offices with the exception of a section

roof is covered with green tile. The exterior design is somewhat unusual for this type of building and is quite different from the ordinary design for buildings of this

frame construction. Inasmuch as it
intended that the building should att
professional men of the better class, it
designed and built to appeal to this c

A view of one tower showing stone entrance

and little expense was spared in its erection or equipment.

In the design, the hospital idea was borne in mind so that the offices would afford, as far as possible, the same conveniences to the medical man as does a modern hospital. Each office is equipped with a lavatory which has both hot and cold water, foot controlled, delivered through a single spout. Phone connections to the reception room, heat, electricity, gas and compressed air are also installed in each office. Additional equipment for laboratory use is also supplied to some offices as permanent fixtures. Steel trim and a sanitary base are used in the offices, and, where desired, a rubber tile floor is supplied to the prospective tenant at a small additional rental.

The second floor contains the reception room, an X-ray laboratory, nine offices, three small apartments and six closets. These closets are rented out at a small rental to those tenants who find closet space desirable. The three apartments are intended to provide living quarters for a few of the tenants who occupy office space, and it is not the intention of the owners to rent these apartments to people who do not occupy an office in the building.

The corridor layout and reception-room-opening arrangement is such that access may readily be had to any office on the second floor. The plan shown here makes it unnecessary for a patient to go through the reception room after leaving the doctor's office. The fact that the toilet rooms for the different sexes are located in different corridors but are so located to make only one set of supply pipes necessary is also worthy of note.

The third floor is given over to one large office, three dental offices, an office designed for an eye and ear specialist and an unsubdivided space which can be partitioned off to suit the needs of the occupant. Two dental offices are arranged to open from one corridor door and the whole layout of the two offices consists of two operating rooms, a laboratory, a rest room, a sterilizing room, a dark room and a business office. The third office is adjacent to the office designed for the eye and ear specialist and is so planned that both offices could be thrown together if such an arrangement became desirable. Although the office for the eye and ear specialist is only 19 ft. 4 in. long, additional length is supplied for testing eyes by the location of two closets in the mansard roof.

A view of one facade showing the copper cornice and downspout

Woltersdorf & Bernhard of Chicago were the architects and Jacob Rodatz was the general contractor.

As this issue of National Builder goes to press, it is sizzling hot in Chicago. A good, big, broad, cool porch would be as much appreciated as a freezer full of ice cream or a dip in old Lake Michigan. No doubt it is warm elsewhere and many a prospective customer of every contractor and builder is just in the frame of mind to have a new porch built onto his house. The pictures above ought to be helpful in getting some new porch business. Use them for that purpose

Facts About Two-Family Houses

By H. T. Becker

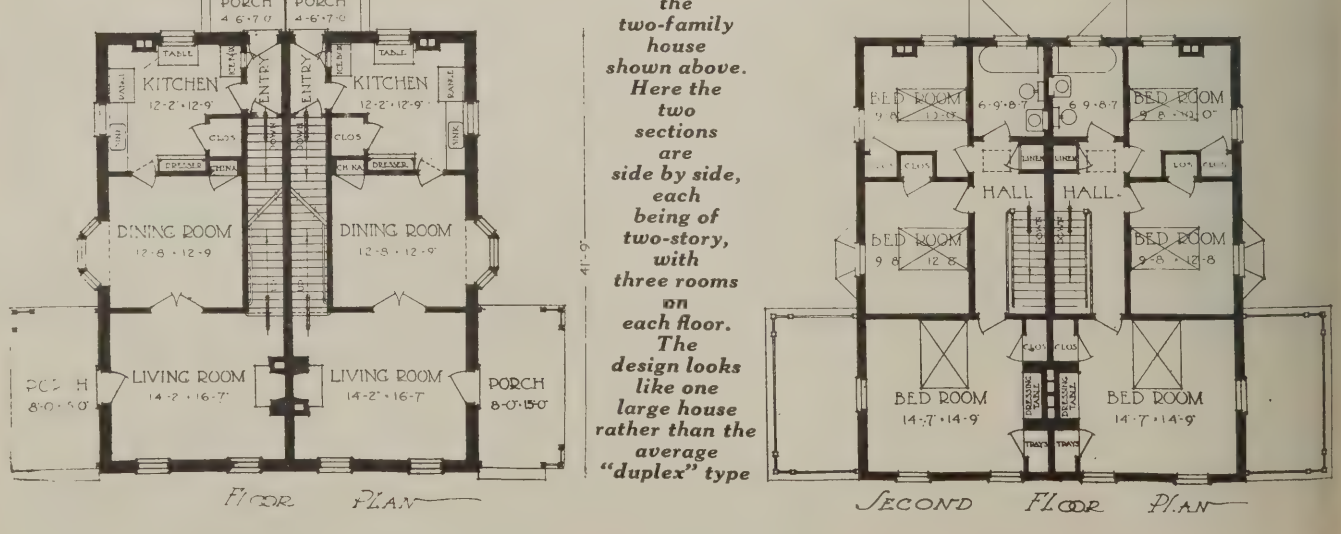
Illustrations by Courtesy of Curtis Companies' Service Bureau

A colonial design for a two-family house to be built of brick. Each family have their own porch and entrance and each apartment is of two stories

LAST year, alone, it is estimated, the subscribers for NATIONAL BUILDER built 5794 two-family houses! If these were placed on 50-ft. lots, in a row, there would be a string of them 55 miles long and they would accommodate nearly 11,600 families or over 52,000 people! The very fact of the constantly-increasing demand for such homes indicates that the double house is being found to meet an economic condition which actually exists and must be met.

Perhaps the strongest argument in favor of the two-family house is its proportionately lower cost. At least, cost is the stone-wall most often keeping prospective clients out of the longed-for realm of home ownership. The statistics of the Department of Labor show the average one-family house costs $3967, and the average two-family house $6700; in other words a straight saving of $1234 is effected by building the two homes together. This does not take into account the price of the lot, which is really a greater factor than the cost of materials. Land values have increased to the point where it is often out of the question for the small home-builder to afford enough ground to build a home that will comfortably house his family, if he wishes to be reasonably "close in" and in a desirable residence section. For many such, the arrangement by which another family shares the same ground space by increasing the capacity of the house, represents the only oportunity to have homes of their own.

From the investment standpoint, the two-family arrangement has unquestioned advantages. Advertisements of such houses, calling them "a home that buys itself," are very attractive and convincing. It is claimed that the rental from one apartment will practically cover the taxes and upkeep for the whole building, leaving the owner-occupant of the other apartment only the installments on his investment to meet. These would probably not greatly exceed the price he would be forced to pay for less desirable rented accommodations. And after the building is paid for, there



Plans for the two-family house shown above. Here the two sections are side by side, each being of two-story, with three rooms on each floor. The design looks like one large house rather than the average "duplex" type

Sketches for a "Duplex" and a Semi-Detached House

Frederick L. Ackerman,
Architect

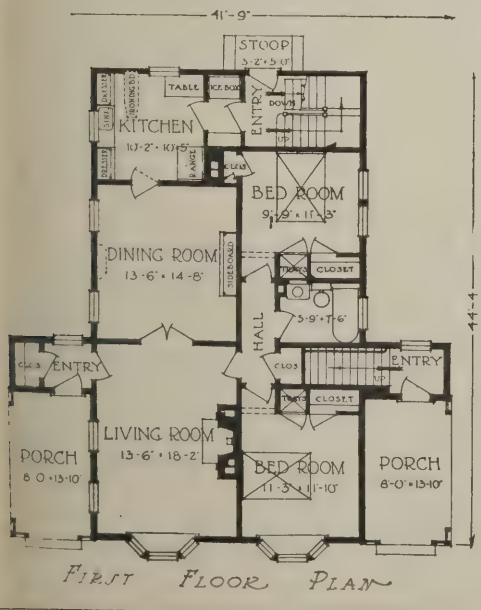
A colonial design for a two-family house to be built with clapboards. Each apartment is on a floor by itself and each has its own porch and entrance

s a steady income which will more than lefray expenses on the property.

Because we seem to be in a transitory tate in this matter of one-family or two-amily houses, gradually working toward he apartment building, but not quite ready o give up the old home-idea, the demand t present for two-family buildings is for hose which have the outward appearance f a large single house rather than a flat. The sort of a plan which gives us a large ize residence in outward looks, and yet ouses two different families, seems to meet he requirements admirably.

The larger the building, the more impor-ant is the choice of a design, and in the selection of both plan and design the contractor has more and more responsibility to his customers. He must know where to obtain plans that meet these requirements and are practical as well.

Double or two-family houses are divided into two types by architects—duplex and semi-detached. In the duplex house the apartments are placed one above the other; in the semi-detached they are side by side, with room arrangement reversed. Because the two parts are identical, it is not hard to find a well-balanced, or symmetrical, design. But to find one that at the same time has good looks—in other words, architectural value—is an entirely different matter, and much more difficult. One house of each type is shown here with its floor plans. Both of these are excellent examples of what may be done with two-family homes by a skilful designer with the know-how of good planning. Each presents the appearance of a single large home, so much to be desired, yet each contains two complete homes, with large rooms, incorporating all the necessities and luxuries of modern dwellings. The item of built-in conveniences is one that demands especially careful consideration in plans for houses of this type, because the saving of space and the utilization of every nook and cranny is imperative. Notice the exceptionally good equipment of both plans.



First Floor Plan

Plans for the two-family house shown above. Here each division of the house is on a floor by itself, yet the exterior appearance of the design does not reveal its two-family character, hence the house is one that will qualify under the strictest zoning regulations. The second floor family have their own downstairs porch and entrance and need not come into contact at all with occupants of the main floor apartment

Second Floor Plan

A Typical Six-Family Chicago Apartment Building

FOR most localities and for the requirements of most builders, a six-family apartment building exactly fills the bill. It does not require an extraordinarily large investment, yet it is large enough to reduce the overhead on each apartment to a profitable figure and so to return a good percentage on its cost. The building illustrated here is typical of the kind of apartment buildings of this size which are to be seen in all parts of Chicago. It was planned and designed by Paul Frederick Olsen, architect.

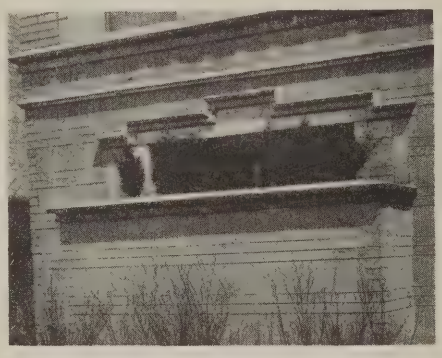
Yellow face brick were used for the front main walls with gray face brick for the base. The side and rear walls are of common brick. The trim is of cut stone. The brick are laid in courses and in various patterns, which also contribute to the design of the building. The yellow walls are relieved by a touch of color in the green tile ornamental roof in front, and a flower box in front of the basement windows of the sun porch projections is another ornamental detail.

In Chicago the law requires that a fire wall completely separate the two divisions of a multi-family building of this type and the plan shows that such a wall extends throughout the depth and height of this building and encloses the stair well.

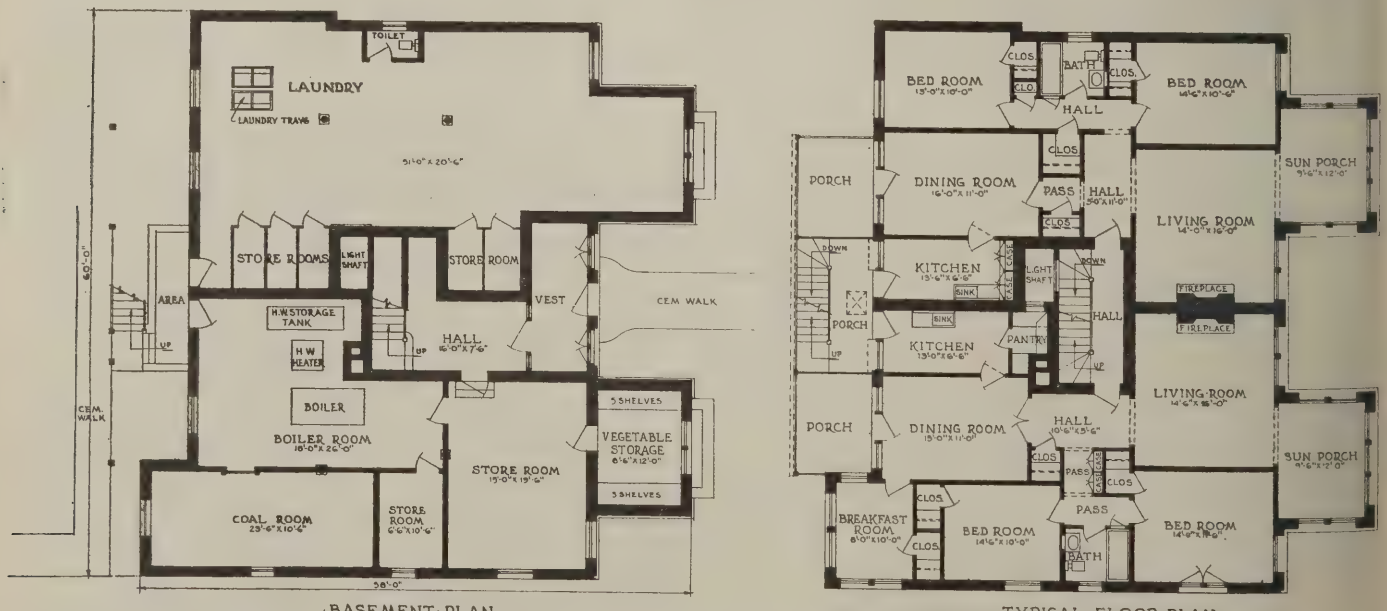
The plan has other interesting features also. Note that it is not perfectly symmetrical. One set of apartments has five rooms each, while the other has six rooms each. In one the hall runs lengthwise of the apartment; in the other it runs transversely. A good arrangement is found in the fact that the living and dining rooms are entirely shut off from the sleeping portion. The chambers have closets and there is a hall linen closet.

The sun-porches are desirable additions to these apartments. By being connected with the living room through cased openings, a spacious effect is produced that makes both living room and sun porch seem large. The fireplace in the living room means much for winter comfort.

The front walls are of yellow face brick, with gray face brick for the base, and the tile roof is green. Designed and planned by Paul Frederick Olsen, architect



A close-up of the window box in front of the basement windows under the sun porches



BASEMENT PLAN — TYPICAL FLOOR PLAN

Note the firewall that completely separates the two sets of apartments and encloses the stair well. This plan is not perfectly symmetrical, for one set of apartments contains five rooms each, while the other set contains six rooms each

A three-car garage, with living quarters above, in Duluth, Minn.

A combination garage and machinery shed on the farm of D. F. Prindeville, in Dixon, Ill.

In the circle: A two-car garage in an attractive setting

The design of the garage should be in keeping with that of the house. This one was especially designed for an English house built of stucco

The clapboards are stained a dark brown to conform with those on the house

Providing a Place for the Automobile

A GOVERNMENT bulletin says that 34.5 per cent of all buildings constructed in 1921 were private garages and that numerically they are second in importance only to one-family houses. Obviously, therefore, the designing and construction of these little buildings should be a very fertile field for the contractor and builder to work.

The garage should harmonize in appearance with the house to which it belongs. That is, it should probably be built of the same material as the house and with the same type of roof and the same kind of roofing. And it should be placed carefully upon the lot so as to enhance rather than to restroy the beauty of the place.

As to the construction of the building, it should be unnecessary to state that the garage must be large enough to accommodate the car, or cars, which it will house. Yet many a garage is built too narrow or too short and the result is scarred fenders, broken doors and dissatisfied customers for the builder.

Without doubt the most important feature of every garage are the doors. If they don't work right, the garage is not a success. Invariably the satisfaction that they give is due directly to the kind of hardware employed—the track on which they slide or the hinges on which they swing. There are many types of garage door hardware on the market today and the contractor and builder ought to know something about all of them so that he can correctly advise his customers what kind of hardware to use and give them entire satisfaction in the garages he builds for them.

Remarkable Success of Two Tennessee Builders

D. L. Maugans

A lumber tally man, who had studied a correspondence course in architecture for which his boss had subscribed; a returned soldier with some contracting experience but little capital — these were the ingredients that, in 1919, went into making a successful partnership and a profitable business, now known as the Maugans-Bell Company, in Murfreesboro, Tennessee. How and why this partnership has grown is the substance of this story of success

W. R. Bell, Jr.

ONE hears constantly about stories of success, about rapid rises to wealth and power and about any number of ways and means of building a business. Some of these stories have an actual basis for their origin, some are partly true, and others are fiction pure and simple. There is one case, however, which has come to our attention and which is so interesting and contains so many good ideas for others to profit from that the story is worth telling to NATIONAL BUILDER readers. The principal characters are D. L. Maugans and W. R. Bell, and the story deals with the business of the Maugans-Bell Company of Murfreesboro, Tennessee, which has grown from its organization in 1919 to a general contracting and building supply firm doing a volume of business which runs into several hundred thousand dollars per year. This story also serves to illustrate how two men, though only fairly successful before entering a partnership, have managed to build the biggest general contracting business in Murfreesboro.

About twelve years ago, Mr. Bell of this firm was working as a lumber tallyman for a concern in a small southern town. The owner intended to branch out into the millwork business, and to better his knowledge of construction he subscribed for a correspondence course in architecture. He was a busy man, however, and had little time for study so he turned the course over to his assistant, Mr. Bell. This correspondence course in architecture is the only technical education Mr. Bell possesses. That he studied and that he was able to apply this course to practical usage is demonstrated by the fact that he is a licensed architect in the state of Tennessee.

The other member of the firm, D. L. Maugans, is a contractor who has learned the business in the school of experience. He was engaged in the contracting business in Murfreesboro in a small way but only with a moderate amount of success until the outbreak of the Great War. He entered the army and was assigned to the construction division in France, where he was engaged in superintending the erection of various structures. After the war he came back to Murfreesboro, met his present partner, and in May, 1919, with a force of three men, they embarked in the building contracting business. Work began coming in and they kept adding to their organization until now, in the building season, they manage to keep over 50 men busy. All branches of work, including plumbing, plastering, electric wiring, heating, etc., are done by the firm's own men.

As more work was coming in right along and as a boom was in sight, the two partners decided to open a yard for building materials and supplies, more for their own needs than with the idea of starting a building supply business. It happened, however, that occasionally one of their contractor competitors, who ran short of a few bundles of shingles or some chimney flue, came to the Maugans-Bell Company to buy it and as this sort of thing grew more frequent the business developed a building supply branch in conjunction with the regular construction work.

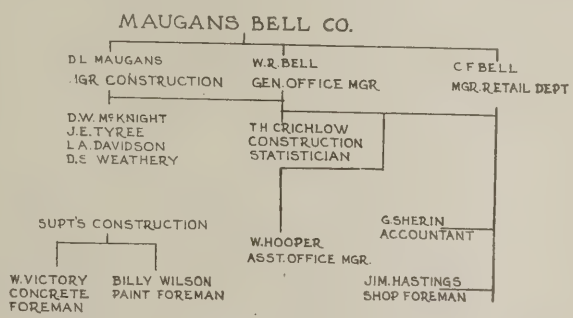
Office and yard force employed by the Maugans-Bell Co., Murfreesboro, Tennessee, in front of their plant and showing some of their delivery equipment. Reading from left to right: C. F. Bell, manager retail building materials; G. F. Shearon, accountant; W. R. Bell, Jr., general manager; D. L. Maugans, manager of construction; Warner Hooper, assistant office manager; Sutton Pullins, yard foreman; Newt Hodge and O. T. Rayburn (colored), wagon drivers

A house built by the Maugans-Bell Co., from materials furnished by themselves

A barn designed, planned and built by the Maugans-Bell Co. Their work is of varied nature

The problem here, however, was how to sell building materials to men whom they were competing with for construction work, and the way it was solved was by making it understood that the Maugans-Bell Company, as dealers, sold materials to the Maugans-Bell Company as contractors, for the same price these materials were sold to other contractors. Thus, competitors, assured that they were being treated squarely, came over to buy building materials and even to solicit help in getting out sketches and making contracts. Mr. Bell often assists smaller contractors to get business which his own firm does not see fit to handle and by this means has secured quite a bit of custom for the sale of building supplies. He has had the experience of having a competitor in the contracting business underbid him by $150 on a job for which he made the plans, but instead of cussing his bad luck he went right out and sold the lucky bidder the materials for the house.

An interesting feature in connection with the building supply business is the establishment of the lime slaking plant described on page 73 in this issue. This slaking plant was established so that the lime could be unloaded from the car directly to the plant, and here slaked and stored and delivered on the job as lime putty when it was needed. Other contractors got into the habit of sending around to the Maugans-Bell Company for a barrel or so of lime putty when they had a job too small to warrant the erection of a slaking box of their own until finally the lime putty business has grown to considerable volume and several contractors in Murfreesboro are using it instead of making lime putty themselves. This is only one example of the many ways in which business may be expanded.



Organization chart of Maugans-Bell Co. Such a chart helps to systematize work and to fix responsibility

The Maugans-Bell Company look forward to more business this year than ever before in both their contracting and building supply branches. They operate three Ford trucks and expect to add a heavy truck to this fleet during the coming season. They use a Cincinnati and a Koehring mixer in their work and a lot of other contracting equipment. They have succeeded in building a business in the face of strong competition and their success is due not only to their ability to make use of favorable circumstances but also to the fact that a certain balance between them made possible an achievement which would have been extremely difficult had either tackled it alone. Examples of some of their buildings are illustrated.

Here are two houses built from the same plans furnished by The Architects' Small House Service Bureau, Northwestern division. Their only differences, aside from the fact that one is the reverse of the other in plan, is in the colors which they are painted, showing the importance of selecting the proper colors for the best effects

Plumbing for Country Homes

By Ivan D. Wood

NOT many years ago the plumbing which was done in the country was of a rather inferior grade. Often it was installed by well men or second rate plumbers who were not experienced or careful enough to work in larger towns. One occasionally sees remnants of their work today, such as sinks boxed in underneath with a little closet where rags and dirt may accumulate and where fresh air and purifying sunlight will never penetrate. The same plumber would install a soil pipe with no possible means of cleaning it out if clogged or would connect all kinds of fixtures to the soil pipe without proper venting and wonder why there were foul odors in the house and why some of the fixtures drained so slowly. I am glad to note that there is a vast improvement in the class of work which is being done today in the country communities.

Facts About Fixtures

Kitchen sinks are nearly always placed too low and in consequence hundreds of women stoop over many hours each year in doing dishes and canning fruit as they stand over these sinks which have been awkwardly placed. The top of the sink should not be less than 36 in. from the floor and may be made higher to a good advantage in many cases.

In the choice of fixtures it is well to look to the ease with which they can be cleaned out and kept clean. Cheap cast iron enameled sinks often are made with sharp angles and deep depressions for holding soap. These irregularities hold filth and are hard to clean. Fixtures with sweeping curves are easy to clean and do not collect filth easily if not cleaned at frequent intervals.

In the furnace heated house the fixtures, such as sinks placed near the outside wall, will give little trouble if the water is shut off on the coldest nights or at times when the fire is out for several days at a time. In houses where stoves are used, some trouble will be experienced in cold weather with frozen pipes, and replacements are expensive. It is a good rule to keep the pipes on the interior walls if possible. The old notion of boxing in the bath tub and the sink should have gone long ago but some plumbers still do it, even though good practice calls for all pipes in plain view so far as possible and the latter method has two advantages, namely, that a leak can be easily detected, and the sunlight chases away foul odors. All pipes containing water sweat in the summer time and cause a certain amount of dampness which should be allowed to dry up.

Venting Is Important

I have found that proper venting of the plumbing system is one very much neglected point. A method of venting is illustrated in Fig. 1, showing various fixtures connected up to the soil pipe which runs to the septic tank. It will be seen that the soil pipe runs up through the house like a chimney and that all the fixtures empty into it directly or indirectly. Any sewer gas which may come back from the septic tank finds a ready means of escape through the "stack" as the pipe through the roof is called. Some plumbers, to save expense, run a small pipe instead of a large one, through the roof. This is prohibited

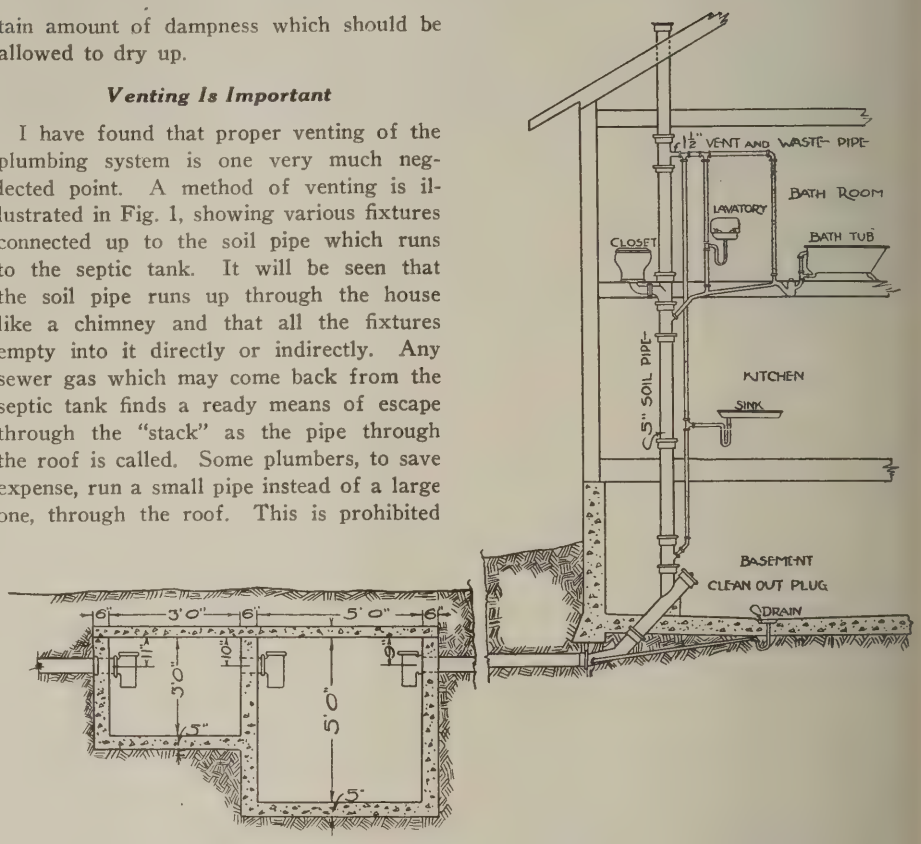


Fig. 1—Showing proper method of connecting fixtures to septic tank

in many cities on account of the fact that the small pipe can easily become frosted over in winter and cease to function. With a large pipe, this danger is remote.

While, as stated, almost every city requires venting, in its plumbing restrictions, in country districts, at least, this is more or less neglected. Let us see what will happen if a fixture is not vented. In Fig. 1, a lavatory is seen on the second floor. It will be noticed that there is a "trap" or curve in the pipe beneath this lavatory. The function of this curve in the pipe is to hold a plug of water to prevent sewer gas from flowing into the room from the "stack." If this plug of water is removed, foul odors may be detected. It will be noticed that a 1½-in. vent-pipe leads into the stack from this fixture. Now suppose this lavatory is flushed and there is a rush of water into the "stack" through the pipe leading from the lavatory to "stack." This water flowing will create a suction which will draw out the plug of water in the "trap" of the lavatory if the vent pipe is not provided as shown. The vent pipe allows a free passage of the air and prevents syphoning out of the trap. By looking again at Fig. 1, it will be seen that the sink on the lower floor is vented in the same manner and that the vent pipe runs up above the point where the toilet is attached to the "stack." There is a reason for venting the downstairs fixtures in this manner as will be seen when it is considered that flushing the toilet causes a heavy flow of water down the "stack." This flow presses the air in the pipe ahead of it and would cause a pressure on the line leading to the sink which would, in turn, cause the sink to bubble and discharge sewer gas into the room, were it not for the vent pipe leading to the second story.

The Septic Tank for Sewage Disposal

The "stack," which has just been described, is made of 4-in. cast-iron pipe with bell joints sealed with lead and okum. This length of pipe, extending from basement to roof, is heavy, and must be set on a good foundation if settling is to be avoided. Settling means parting of the joints, leaking and danger to the health of the family. The 4-in. pipe leads out the cesspool, septic tank, or sewer as the through or under the foundation and to

case may be. Fig. 1 shows a cleanout plug which should not be omitted on any system.

The farmer is always confronted with the problem of sewage disposal. No sewers are built for him to connect to, so he has one of several alternatives from which to choose. He can put in a cesspool, which is simply a hole in the ground, bricked up with porous walls through which it is hoped that the sewage will seep away into the soil. An investigation of many cesspools around the city of Lincoln and in other parts of Nebraska, seems to show that the sewage does in some cases seep away, but in many cases it does not and the cesspool has to be pumped out once or twice a year. Aside from this undesirable feature, there is the chance of infecting the water supply and causing death in the family.

Sewage can be carried to an open draw and there allowed to run out into the open air. This cannot be recommended as good practice for there is danger of undesirable odors and infection to water supplies of the neighbors. Even though the danger might be slight from this source, the neighbor would have the long end of the evidence if he should decide to enjoin one from such a practice in court.

The septic tank obviates all of these difficulties and has few disadvantages. It consists of a concrete box, placed under the ground at a depth of a foot or so, into which the sewage from the house is allowed to flow. The tank which has given the best results in Nebraska is shown in Figs. 1 and 2. There are two compartments, the first and second chamber as they are called. The first chamber is 3 ft. wide, 5 ft. long, and 5 ft. deep. The second chamber is 3 ft. square. The top is covered with concrete slabs as shown in Fig. 2. These slabs or planks can be lifted off at any time, if it is desired to clean out the refuse which may not be dissolved. This will not be necessary very often for some have been in operation for 12 years and have never been opened.

It is not necessary to put chemicals of any kind in the compartments. The action of bacteria do the work of transforming the sewage into a colorless and almost odorless liquid. When the tank becomes full to the overflow pipe with sewage, a thick scum forms over the top. This scum makes an airtight covering and directly under it the bacteria work. It will be noticed that the tile entering from the house and the one leading to the distribution system, turn down where they enter and leave the tank. This turning down of the tile permits the sewage to enter and leave the chambers without disturbing the scum which is so important to successful operation. The fluid which leaves the tank is known as the "effluent." It is colorless and looks very much like clear water, but microscopic examination proves that it still contains germs of human disease and is not to be considered harmless.

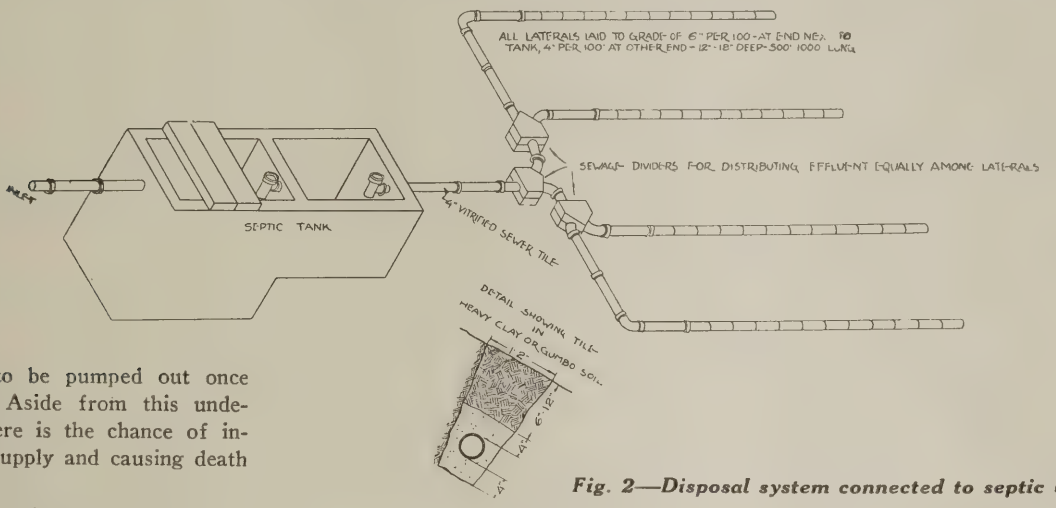

ALL LATERALS LAID TO GRADE OF 6" PER 100 - AT END NEAR TANK, 4" PER 100' AT OTHER END - 12"-18" DEEP - 500' 1000' LONG
SEWAGE DIVIDERS FOR DISTRIBUTING EFFLUENT EQUALLY AMONG LATERALS
INLET
SEPTIC TANK
4" VITRIFIED SEWER TILE
DETAIL SHOWING TILE IN HEAVY CLAY OR GUMBO SOIL
12"-18"
4"

Fig. 2—Disposal system connected to septic tank

This effluent must be disposed of in some manner and many persons seem to think that it can be run into a cesspool with perfect safety. The practice is not to be recommended for the proper method of purification is to allow the overflow from the tank to seep away into the top soil by laying a tile system as is shown and explained in Fig. 2. The lines of tile are laid with a grade of about 6 in. per 100 ft. and are placed from 12 to 18 in. deep. Records of more than 1,000 tanks in Canada show not a single case of freezing where this system was followed. In tight clay soils the tile is surrounded with gravel, sand or cinders to increase the porosity and permit the fluid to flow away faster. The "effluent" seeps into the soil and is again attacked by bacteria which are unlike the ones in the tank in that these work in the presence of air, hence the lines of tile must not be laid too deep for these bacteria are found in the top soil where air is plentiful. In the course of a few hours the once dangerous sewage is pure water seeping away in the ground. One farmer near Lincoln runs his distributing tile under the strawberry bed and finds that several rows of berries are benefitted thereby. Under ordinary conditions, four lines of tile, each 125 ft. long, will make an adequate distribution system.

Success of the Septic Tank in Nebraska

An investigation of septic tanks in the state of Nebraska was recently made by the College of Agriculture at the University of Nebraska. The results were very favorable to its use. Twenty-eight owners were interviewed and almost no trouble reported. One man provided no overflow for the tank at all and, of course, did not meet with much success until the trouble was corrected.

Twenty-one of the tanks had two chambers, five had one chamber, while two had three and were commercially made affairs. All of them seemed to be giving the best of results. It was found that all kinds of toilet fixtures were being used in connection with the system. Two Franklin county men reported having floor drains, lavatories, bathtubs, kitchen sinks and toilets connected to the septic tanks and experienced no difficulty.

A summary of the results is shown below:

Average cost of two-chamber tank with distribution system	$136.00
Number using tile distribution system	16
Number using cesspools	9
Number using other methods such as opening to a draw	3
Number reporting successful operation	28
Number reporting serious difficulty	None
Number using all bathroom fixtures in connection	25

A bill of the materials needed for the construction of a two-chamber tank such as is shown in the drawings is given below:

18 sacks of Portland cement (for 1:2:4 concrete mixture)

1½ cu. yd. of sand

3 cu. yd. of crushed rock

20 iron rods, ⅜-in. diameter, 46 in. long (reinforcing for slabs)

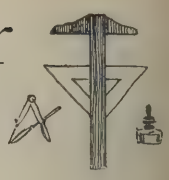
2 4-in. vitrified tile tees

1 5-in. vitrified tile tee

20 to 50 ft. of 4-in. vitrified sewer pipe

500 ft. of common 4-in. drain tile for disposal system.

Suggestions for the Beginner in Architectural Drawing



By V.L.Sherman

THE experiences of fifteen years convince the writer than anything new in drawing instruction is rare, that the sea of books on the subject is so level that a good one sticks up like a lighthouse, but most of all that the successful draftsman skips the texts to study the subject. With all that in mind the author apologizes for his offering, and hopes that he may point out some of the things to gain by drafting and some of the things to avoid.

While drafting or drawing may be an art, it is always secondary to the subject, and would not exist without the subject. Most of us got along for centuries without graphic descriptions. Then what is drawing for? It is to complete work done in the mind before chancing the dollars. So, how much would a draftsman be worth who did not know construction? Drawing is also used to develop ideas to a working basis. It is used as a means of comparison. And it is used to direct a number of workmen on one task. It is the greatest economy, but sometimes the greatest danger. Drawings made by men who know the work will save in time and money. On the other hand, drawings made by a careless or ignorant draftsman will break the bank.

Real craftsmen can put through work that is right in every way without a line to help. If you wish to economize on time, or picture the work beforehand be sure you know all you can of the craftsman's side. No drawing will help on looks alone, and a poor drawing made by a capable workman is dollars to doughnuts against a pretty, unreliable drawing. Don't hesitate to draw because your hands are calloused and it is hard to manipulate the instruments. The real manipulating is done by the brain.

If you want to study architectural drawing study drawing, but study construction and architecture more.

Since drawings are made for economy in operation a system of drawing must be followed that is sufficiently standardized to avoid any misunderstanding. Working drawings are not pictures and they cannot involve perspective, the appearance of distance. They must be made to scale or very thoroughly dimensioned. Each section of the drawing, or view, must stand in relation to the other views on the same sheet. Here we come to the system of "planes of projections."

Fig. 1. Projection drawing is the presentation of a figure made by projecting the necessary points in a figure onto planes by means of parallel lines. These planes are generally known by the position they occupy: *the horizontal plane, the vertical plane, and the perpendicular plane.* The last named being at right angles to the first two. For convenience in regarding the different arrangement of views the planes are arranged to form four quadrants or angles of projection, and are numbered as shown in the figure.

It is assumed that the draftsman approaches the planes from the front for the front view, from the top for the plan view, and from the right or left for the side views. He is never behind the planes. The mechanical draftsman of Great Britain makes use of the first quadrant, and the arrangement of views on unfolding them and arranging them on one sheet is shown in Fig. 2. The general rule, however, is to use the third quadrant which is shown in Fig. 3.

Unless a real knowledge of the planes exists a draftsman is likely to become badly confused, and in such confusion there is the greatest danger, especially in machine drawing. One instance I have in mind is that of a graduate engineer who inadvertently placed an end view of a jig at the wrong end of the front elevation. The mistake was passed into the tool room and about eight thousand dollars

BY publishing this and subsequent articles on architectural drawing, National Builder is not trying to conduct a school; if these discussions result in a better understanding of the principles of drawing on the part of men whose business is construction, they will have served a useful purpose. On page 80 a few facts are given about Mr. Sherman, the author, which should establish his authority on this subject. As you read the articles you will see that they are different from the orthodox treatment of the subject in that they consider drawing as secondary to construction, and we believe our readers will understand the wisdom of this point of view and appreciate the value of these articles because of it.—The Editor.

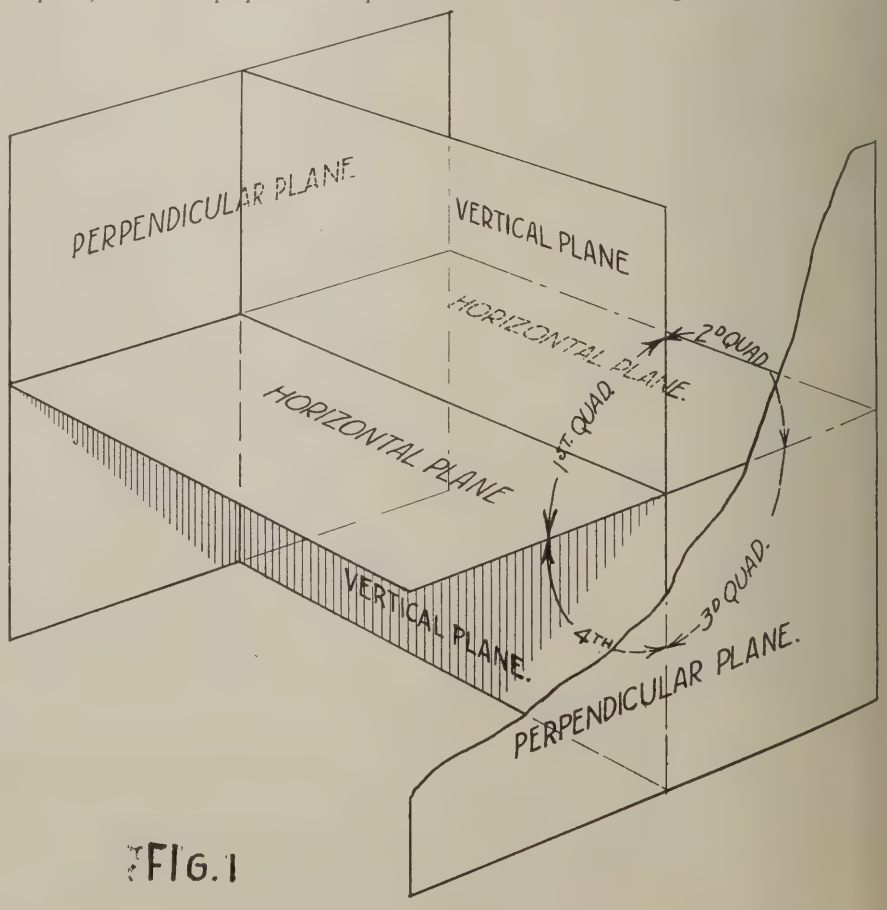


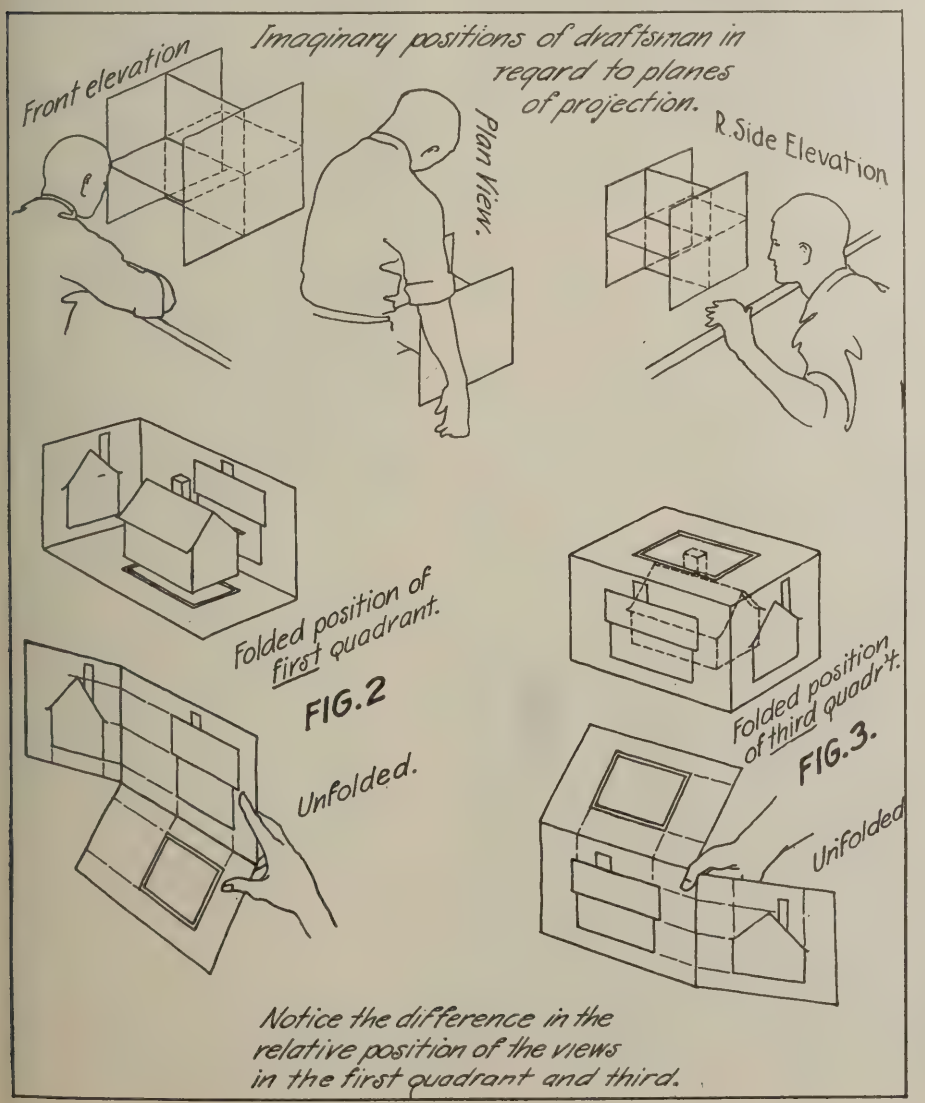
FIG. 1

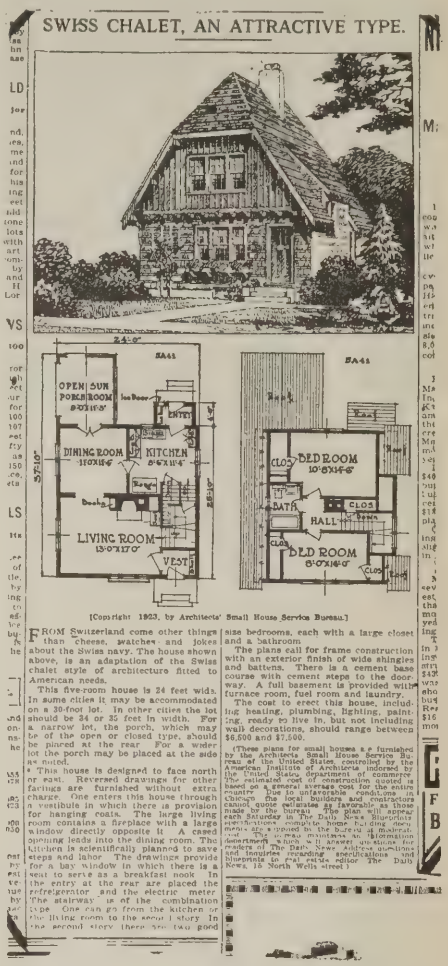
worth of pneumatic hammers would have been put through the operation, completely reversing the air-ports, if the tool maker had not espied the mistake. Mistakes in machine drawing are much more obvious than they are in building drawing so watch your step.

In machine work appearance is of tertiary importance to efficiency and economy. The mechanical draftsman should naturally consider aspect last, and when he doesn't the chief pulls his hair. In architectural drawing every means available should be used to conceive the result before the drawings are O. K.'d. Besides this the designer must be sure that his drawings are free from building errors, and economy and strength are certain. For these reasons it is my belief that a man experienced in a craft, who has handled solids, and can more easily imagine the three dimensions, is much better as a designer than the man whose sole recommendation is that he can draw.

Since final appearances bear so important a part in architectural drawing, consider where the impression comes in. If a building or its parts look natural, or as if they "belonged," its chances for permanent appeal are much better than if it were purposely built to attract notice. After a careless piece of drawing for the figure-head of one of the king's ships Kipling's "Hal" says: "Then he sets me to draft out a pair of iron gates, to take, as he said, the taste of my naughty dolphins out of my mouth. Iron's sweet stuff if you don't torture her, and hammered work is all pure, truthful line, with a reason and a support for every curve and bar of it. A week of that settled my stomach handsomely, and the Master let me put the work through the smithy, where I sweated out more of my foolish pride." So decoration may enhance appearance, but when the whole is decoration appearance suffers. Your work will be appreciated if it regards purpose and utility, if the result conforms to its surroundings.

Lettering is a part of most drawings, and should be a part and not a side-show. Many types of lettering are used and my only advice will be to use that style which comes naturally and to make it *plain and uniform.* Dimensions should be treated in the same way. If you are new to lettering perseverance in the letter o and the downstroke l will bring good results. Guide lines should be used, and regularity of spacing is absolutely necessary. Keep the numerals all of one size, and in making fractions show by making the dividing lines horizontal and the upper and lower numerals the same size as the ordinary figures.


Imaginary positions of draftsman in regard to planes of projection.
Front elevation
Plan View.
R. Side Elevation
Folded position of first quadrant.
FIG. 2
Unfolded.
Folded position of third quadr't.
FIG. 3.
Unfolded
Notice the difference in the relative position of the views in the first quadrant and third.



FROM Switzerland come other things than cheese, watches and jokes about the Swiss navy. The house shown above, is an adaptation of the Swiss chalet style of architecture fitted to American needs.

This five-room house is 24 feet wide. In some cities it may be accommodated on a 30-foot lot. In other cities the lot should be 34 or 35 feet in width. For a narrow lot, the porch, which may be of the open or closed type, should be placed at the rear. For a wider lot the porch may be placed at the side as noted.

This house is designed to face north or east. Reversed drawings for other facings are furnished without extra charge. One enters this house through a vestibule in which there is provision for hanging coats. The large living room contains a fireplace with a large window directly opposite it. A cased opening leads into the dining room. The kitchen is scientifically planned to save steps and labor. The drawings provide for a bay window in which there is a seat to serve as a breakfast nook. In the entry at the rear are placed the refrigerator and the electric meter. The stairway is of the combination type. One can go from the kitchen or the living room to the second story. In the second story there are two good size bedrooms, each with a large closet and a bathroom.

The plans call for frame construction with an exterior finish of wide shingles and battens. There is a cement base course with cement steps to the doorway. A full basement is provided with furnace room, fuel room and laundry.

The cost to erect this house, including heating, plumbing, lighting, painting, ready to live in, but not including wall decorations, should range between $6,500 and $7,500.

(These plans for small houses are furnished by the Architects Small House Service Bureau of the United States, controlled by the American Institute of Architects, indorsed by the United States department of commerce. The estimated cost of construction quoted is based on a general average cost for the entire United States. The Chicago Daily News, in Chicago, has arranged with contractors to quote estimates as favorable as those made by the bureau. The plan will appear each Saturday in The Daily News. Blueprints and specifications complete for building these homes are supplied by the bureau at moderate prices. For more information concerning these plans or answer questions regarding same, address a letter containing stamped and addressed envelope to Small Home Bureau, care of The Daily News, 15 North Wells street.)

National Builder Houses in Many Newspapers

ABOVE is a two-column 10-in. clipping from *The Chicago Daily News* showing the picture and plans for one of the houses designed especially for NATIONAL BUILDER by The Architects' Small House Service Bureau. This design, with complete plans and construction details, was published in NATIONAL BUILDER for May, 1923. Other designs that have appeared in this journal are being released for publication.

This is a part of NATIONAL BUILDER's arrangement with The Architects' Small House Service Bureau. By this agreement, these plans are syndicated to a large group of big dailies in practically every important city. The combined circulations of these newspapers are in the millions. Only sketches of the plans are shown in the newspapers, however, while the complete plans, including all elevations, construction details and material lists, are published in NATIONAL BUILDER, and the reader of this journal gets this service far in advance of his prospective customers.

On the Job with the

In Wisconsin and North Dakota

Roy M. Singer (left), Construction Editor of "National Builder," on the job with A. J. St. Louis (right), builder of Twin Lakes Lodge, a summer camp at Phelps, Wis. Singer picked up a number of good ideas from his observation of Mr. St. Louis' work, and he passed them on to you in the June issue of "National Builder" in the article on summer resort construction. These pages will become a regular feature of "National Builder" hereafter, and they will bring you, through the pen and camera of the Construction Editor, first-hand information about how leading contractors and builders everywhere solve difficult or unusual construction problems. Roy M. Singer is especially well qualified to edit a department of this kind. He is a natural born "on-the-job" man, for he has been a successful contractor and builder himself and he comes from a family of builders and engineers. In addition to inheriting the building instinct, Singer has had professional training. He graduated from Armour Institute of Technology, in Chicago, with a degree in civil engineering. He has had experience in surveying, harbor construction, concrete work and superintendence of building operations. Singer is not a "white collar" man, for his work has been altogether in the field. From now on these pages of "On-the-Job with the Construction Editor" belong to him and he is going to use them for such items as he thinks will be interesting to the man on the job. He has an unlimited mileage ticket which he is free to use as he sees fit, and since he doesn't like to stay in the office, you may expect to see here construction ideas from almost every part of the country. He likes to talk to contractors and on his travels he is going to see as many "National Builder" subscribers as possible and get as many new ideas about construction work as he can find. He will be glad to hear from you any time with ideas, problems, or suggestions which you would like to discuss, or if you have any "kicks" to make, tell them to Singer.

Nail Kegs for Concrete Forms

WHY build a form when an old nail keg will do the work? The illustration shows how Louis Gratias, of Fargo, N. D., uses his old nail kegs and saves money. This "kink" would not do, of course, where a deep footing was required, but it works fine where only a shallow pier is needed.

Nail keg used as a form for concrete footing

Simply dig a shallow hole, drop in the keg, fill it with concrete, and the job is done. When the concrete hardens, the keg may be broken and removed.

Binding Concrete Steps to Foundation

THE illustration below shows how Wallgren & Edlund, contractors of Fargo, N. D., bind concrete steps to a concrete foundation. The iron straps shown projecting from the foundation wall are 3/16 in. thick, bent at both ends, and are placed in the forms when the foundation is poured. When the building is ready for the front steps, the forms are butted against the foundation and when the steps are poured the iron straps projecting into them serve to hold them to the wall.

Iron straps for tying concrete steps

Going Out of the Way to Meet Trouble

HERE is an example of a builder going out of his way to look for trouble. This stairway is of considerable width and therefore it is evident that a heavy load is to be expected, yet the only thing to hold the stringers are nails driven upwards into the girder. While this kind of framing may support the load required of it, nevertheless it may result in an unstable and noisy stair and it is certainly not to be recommended.

A stairway insecurely supported

Notice the fact that one stringer is built up of a 2x2 and a 2x4, with blocks nailed to the 2x4 to support the stair treads and risers. For all practical purposes, these blocks, properly nailed to an inclined joist, are as good as a stringer cut from a joist but in the opinion of the writer, poor judgment is indicated in building up the inclined member as shown in the illustration. A close inspection of the photograph will show that the 2x2 of this built-up member is held to the girder by only two nails, one driven from each side.

This construction is hardly to be classed as good workmanship. Work like this means laying a foundation for future repair bills.

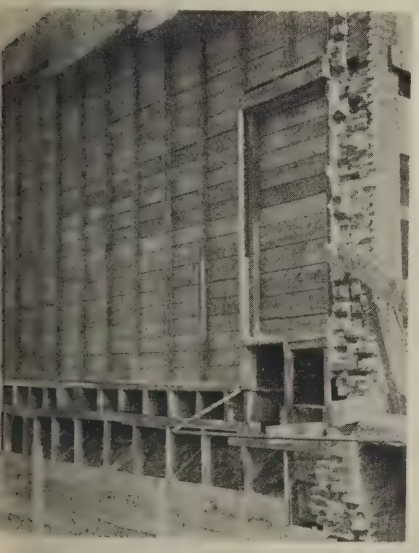
Construction Editor

Combination Underpinning and Concrete Form

N the erection of the 8-story Tennessee Trust Co. building at Chattanooga, Tenn., t was necessary to support a small building adjacent to the side. The method of upport is illustrated by the accompanying

Showing floor joists resting on 4x6 plate

iews. The load of the wall and floor is aken by a system of ordinary 2x4 studing such as is used in the usual form f bearing partition. The floor joists rest



The underpinning studs braced to floor joists

n a 4x6 plate which is toe-nailed to the ops of the studs.

As the excavation for the office building as of considerable depth it was decided o use a concrete wall in the basement

In Tennessee

and to avoid the use of a second system of studding for the concrete form work, the undepinning studs were brought out far enough to meet the foundation wall. They were then braced with diagonal 2x4s, nailed to the studs and floor joists of the building as shown in the ilustration. Then 1x6 boards were nailed against them to form the outside face of the foundation wall. This "kink" was possible because both buildings came directly to the same lot line.

Mark K. Wilson, of Chattanooga, was the contractor and J. E. Martin the superintendent of construction.

Lime Slaking Plant

THE sketch below shows the layout of the lime-slaking plant of the Maugans-Bell Co., of Murfreesboro, Tenn. The operation of this plant does away with the slak-

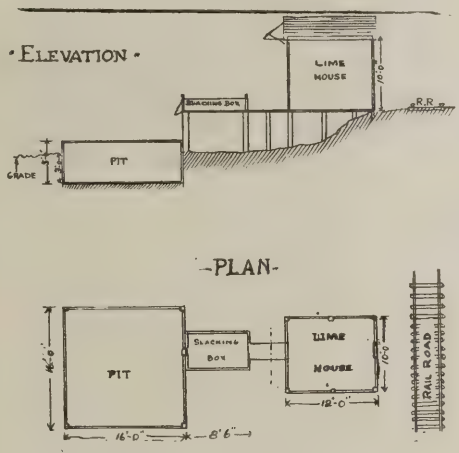


Diagram of lime slaking plant

ing of lime on the job and where enough lime is used to warrant the erection of such a plant a considerable saving in labor should result.

The lime is unloaded from the car to the lime house and there stored to be used as needed. From the storage house the lime is put directly into the slaking box and slaked, then placed in the storage pit and delivered on the job as lime putty as it is needed. The stored lime putty is protected from the weather by a few tarpaulins hung on racks above the pit.

The putty can be stored for a considerable time without deterioration and where it is to be used for a finish plaster coat, plastering contractors generally recommend that the putty be seasoned for a short while rather than be placed on the wall immediately after being made.

The business of bringing a lime box and a mortar box to every job, and placing a man on each job to slake the lime is quite an expensive affair, and if the job is small it is sometimes a problem to keep the mortar mixer from standing idle a part of the time.

In these times when the cry among contractors is for efficiency and continuous operation, and now that the disadvantage of high labor turnover has come to be generally understood, every contractor who is alive to modern methods strives to afford steady employment for his men. A slaking plant such as is described here is one means of keeping a couple of men busy when work is slow.

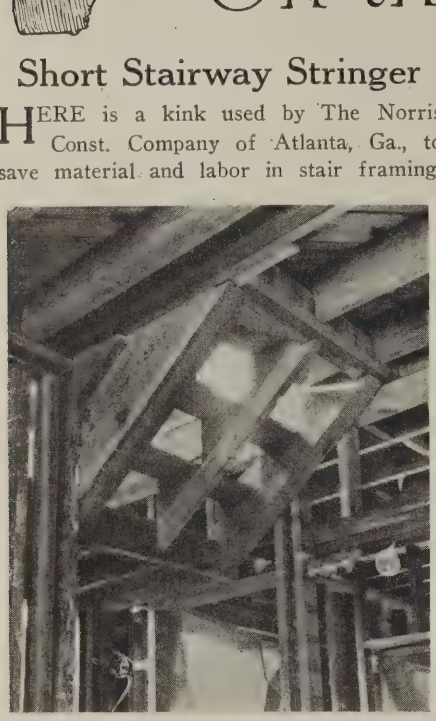
To the contractor who runs only one or two jobs at a time a slaking plant is hardly a profitable investment, as it requires that some money be tied up in the lime-house, slaking box and storage pit and the rental of a site, but for the contractor who has several jobs going at the same time and can keep the plant in operation quite steadily, this idea should be a money-saver.

General view of the Maugans-Bell Co. lime slaking plant

On the Job in Georgia

Short Stairway Stringer

HERE is a kink used by The Norris Const. Company of Atlanta, Ga., to save material and labor in stair framing.

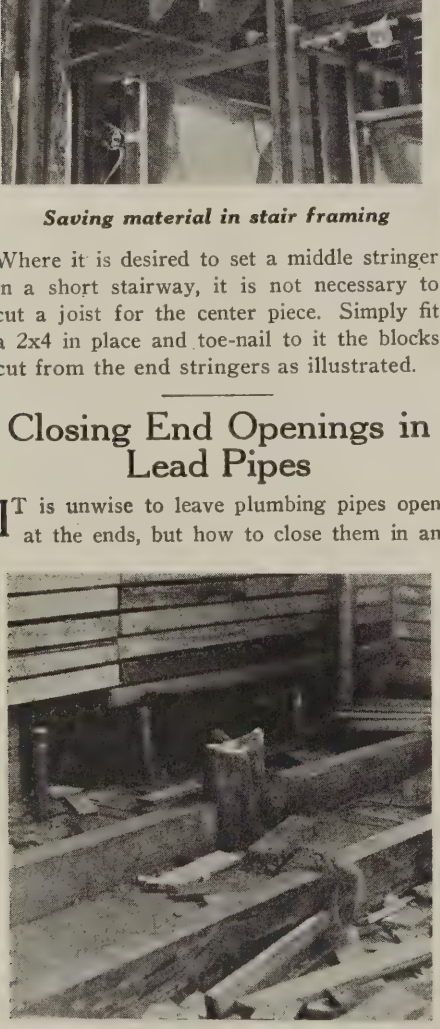


Saving material in stair framing

Where it is desired to set a middle stringer in a short stairway, it is not necessary to cut a joist for the center piece. Simply fit a 2x4 in place and toe-nail to it the blocks cut from the end stringers as illustrated.

Closing End Openings in Lead Pipes

IT is unwise to leave plumbing pipes open at the ends, but how to close them in an



A 5-in. lead pipe soldered shut

easy and inexpensive manner has sometimes been a problem. The accompanying illustration shows the method used by an Atlanta, Ga., contractor to close an end opening in a piece of 5-in. lead pipe. The edges of the pipe are hammered toward the center from two opposite points on the circumference until the opening is closed. To seal the opening, a little solder is applied to the crack, thus making it tight.

Framing an Overhand for a Tile Roof

THERE are many ways of framing an overhang for a tile roof and we show here a method used by the Massel Realty

Fig. 1, showing roof joists

Co. to frame the tile overhang for the Doctor's Building at Atlanta, Ga.

Where possible, the roof joists are allowed to run through the brick wall far enough to provide a nailing base for the 2x4 diagonal supports to which the sheeting is to be nailed. (Fig. 1.) The bottom of these diagonals frame into the protruding joists, and the tops into vertical 2x4s. These vertical studs are toe-nailed to a sill

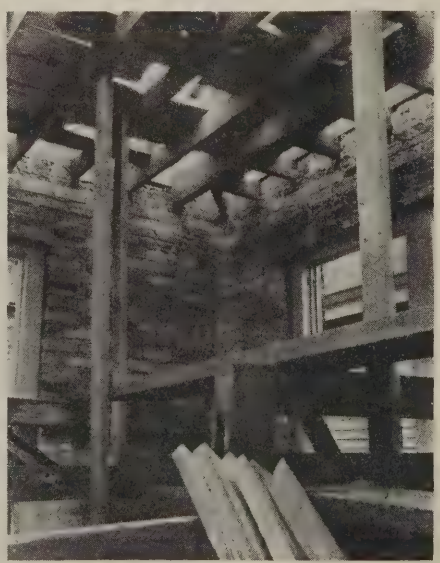


Fig. 2, showing double joist

which is nailed to the protruding joist at the wall, and held rigid at the top by a 2x4 plate. They may be allowed to run past the top of the joist and be nailed to the face.

Where the overhang is to be placed on a wall which runs parallel to the roof-joists, small sections of joist, running through the brick wall, are framed into an extra-heavy or a double joist, which runs

Fig. 3, outside corner framing

parallel to the wall as shown in Fig. 2. The outside corner is built up on a diagonal joist running through the wall and framing to the heavy joist inside as shown by Fig. 2. The manner of handling the outside corner framing is shown in Fig. 3, and Fig. 4 shows how an inside corner in a court is handled. E. C. Seiz of Atlanta was the architect for the building.

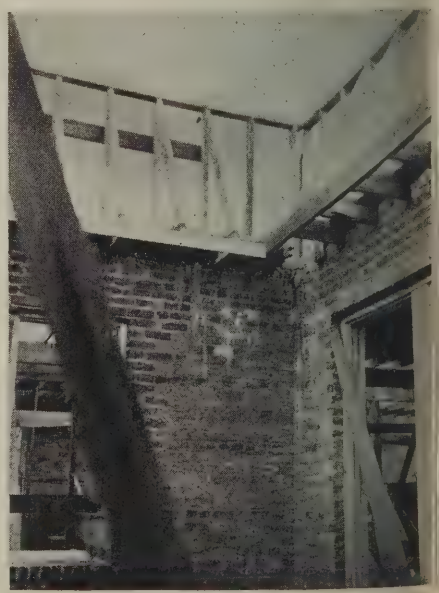
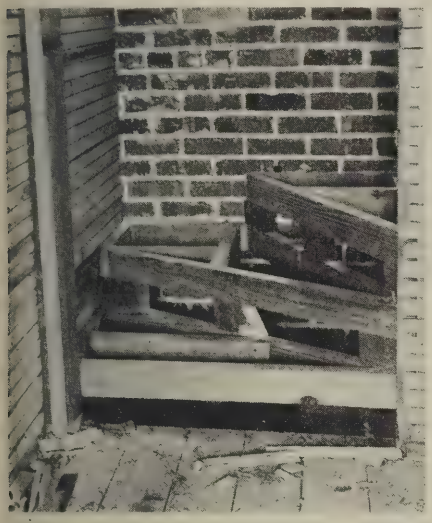


Fig. 4, inside corner framing

On the Job in Iowa

Winders Without Stringers

EVERY carpenter knows what a job it is to cut stair stringers and specially stringers for winders. Charles R. I. Swinford, carpenter foreman for John Olsen of Des Moines, Iowa, frames short winders as shown in the accompanying illustration. Not

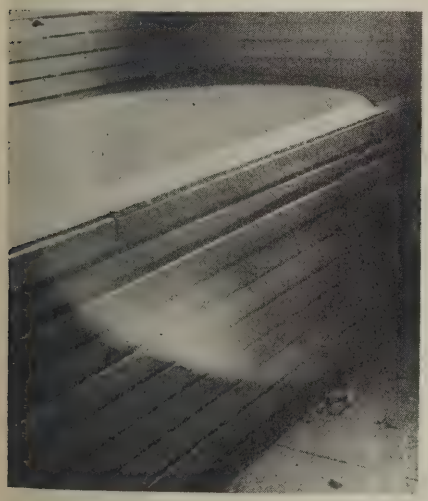


A framing for short winders

only does this method save the labor involved in cutting a joist for a stringer, but also it is a means of using odds and ends of 2x4s which would otherwise be wasted.

Plaster Aproned Bath Tub

W. J. GILLILAND, a builder of Pasadena, Calif., who is building a home in Sioux City, Iowa, uses the idea shown



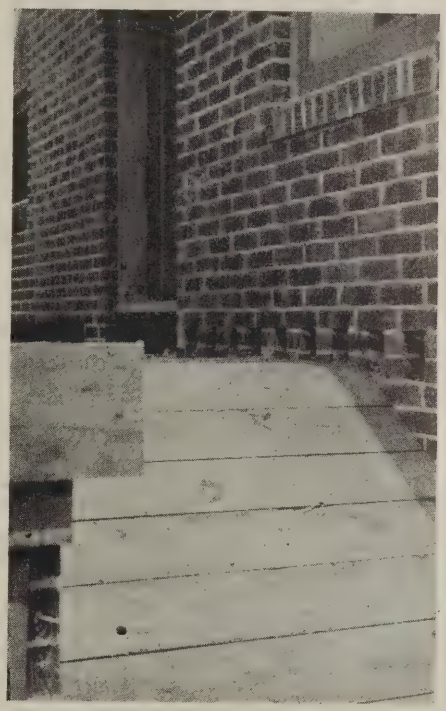
Making a "built-in" tub

in the illustration above as a substitute for the expensive apron tub. He frames around an ordinary tub with 2x4, running headers from the wall at one end of the tub to the partition at the other end. He then laths over the framing and covers the lath with Keene's cement plaster. He gives the plaster three coats of flat white paint, one coat of high gloss enamel and over this a coat of spar varnish. The whole, when finished, is for all practical purposes, as good as an apron tub and it can be built for a fraction of the difference in price between an ordinary and an apron tub.

Reinforced Concrete Porch Floor and Steps

THE photograph below illustrates how McCudden & Allison of Sioux City, Iowa, lay reinforced concrete porch floors and steps.

At the level of the two brick courses where the floor is to be laid, two headers

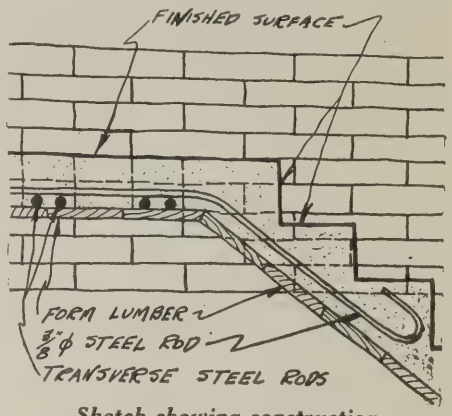


Wood form lumber in place

are laid, one on top of each other and spaced apart, the width of a brick.

The steel rods which form the reinforcing rest in the bottom of the openings shown, and in the bottom of similar openings in the opposite wall. The form work is braced and supported from the ground below. When the rods are set and the concrete is poured, the openings in which the rods are placed become filled with concrete. Filling these openings with concrete, which is part of the slab, not only serves to fill in the wall openings, but also affords a good bond between the brick wall and the concrete porch floor, a thing which is very desirable.

The form work shown in the front of the picture forms the base of a short flight of steps from the porch to the grade level. Mr. McCudden recommends that a few rods be run across the rods which span the porch floor between walls, and these rods bent into the step form as shown in the accompany-

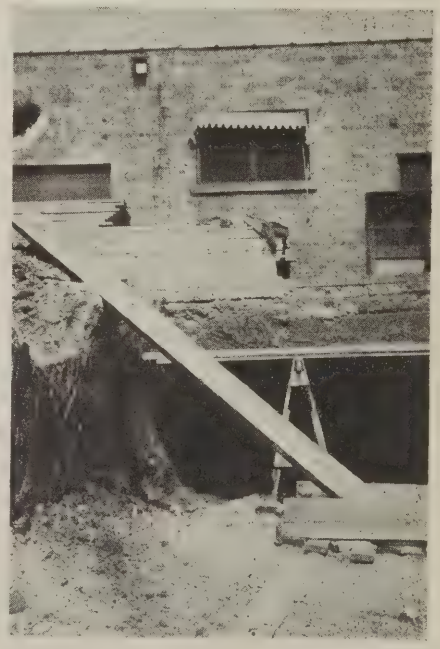


Sketch showing construction

ing diagram. He claims that these rods will serve to bond the steps to the porch floor and will prevent the cracking which generally occurs at the point where the steps meet the floor.

Simple Mortar Chute

SOMETIMES it is inconvenient to bring mortar into an excavation when the hole is small, and it may also be impossible to mix the mortar in the excavation because



Surfaced planks used as mortar chute

of lack of space. When Charles Weitz & Son of Des Moines, Iowa, find such a condition they mix the mortar on the grade level and chute it into the excavation. The chute they use is no fancy or complicated affair, but simply two surfaced planks nailed together at one edge in the form of a "V."

Paint as an Aid to Renting and Selling

5. The Treatment of Interior Woodwork

By Albert Brace

IT is the accepted custom in this day and age to treat interior wood trim in one of two manners, i. e., stain and varnish (or wax) and paint or enamel. To some extent the style has some bearing, Colonial, for instance, calls for a combination of white enamel and red mahogany stain, but for the general run of residential construction the question is primarily based on the quality of lumber used.

Mahogany, American or circassian walnut are pre-eminently furniture woods, and owing to their expensive character are rarely employed on interior trim except in the form of veneers on the paneled walls of living and dining rooms in higher class residences. Where so found, they should be stained and treated in all respects as furniture. Oak has also fallen into this class, and although not used in veneer form to the same extent, nevertheless finds continued popularity in the form of door panels, wainscoting, beams, etc., and offers a tremendous variety of stained effects with or without filler. It is never enameled or painted.

By all odds the most popular woods for interior trim today are birch and gum. The former from protracted demand is advancing into the ranks of scarcer woods, but up to the present it has shared with gum an equal preference. While in themselves they offer an excellent base for enamel and may be properly so treated if there is a definite desire for such a finish, both can be stained to such faithful imitations of genuine mahogany or walnut that it seems a travesty to treat them otherwise. Not only do they take all reddish or brownish stains effectively, but in many cases it would require the eye of an expert to differentiate these from the more expensive woods above mentioned. With modern furniture running almost 90 per cent to brown mahogany and Italian or American walnut, birch and gum properly finished offer a most inviting and harmonious background.

Poplar, poor runs of pine, fir and cypress are from every point of view best done in enamel or paint. Not that they necessarily offer the best anchorage, but a good painter can overcome this successfully and the naturally unattractive figure, holding out little possibilities of beauty with stain, is hidden by the lustrous sheen of enamel and made to appear rich and decorative. So far as relative costs go, any saving in this combination is a question since at least four and sometimes five coats of enamel are necessary with attendant labor expense as against an application of stain and shellac and one or two coats of varnish on the favored woods.

Yet the mere fact that trim happens to be composed of birch, gum or pine is not sufficient basis for deciding offhand on a stained or enameled finish. Certain runs of birch take a stain black in streaks, certain runs of gum include a variety of sappiness producing a vari-colored effect in stains not altogether pleasing, whereas certain runs of pine take a dark colored stain, weathered oak, for instance, in a most attractive way. There is figured birch for doors and figured gum for paneling that rival mahogany and walnut for sheer natural beauty and unselected cypress lumber that no stain can subdue ot a restful tone.

A solid pine door stained a mellow Flemish brown with oil stain, the figure being brought out to just the right degree

As staining is less of an exact science than enameling for the reasons above stated, and also satisfies a wider range of tastes, its possibilities will be considered first, confining detailed discussion to the woods in most common use. As for the stains themselves, it may be said in passing that those most favored today are of an aniline or mineral type, generally known as "penetrating" oil stains for the reason that they color the wood by absorption into the fibres rather than by lying on top.

The Choice of Stains

In the case of any stain, however, it does not follow that merely because it has a name such as "red mahogany" and gives a certain effect on birch, for instance, that the same stain will give an identical effect on gum, cypress, poplar, etc. In fact, it may well be apt to give an entirely different effect on two different pieces of birch, so that if any degree of precision is necessary it will be advisable to have the stain tested out prior to applying on the trim. Acid or water stains generally give a more uniform, clear toned effect than oil stains, but the required sanding down on the fibres raised by the water makes the labor cost of using them prohibitive in nine cases out of ten.

Similarly with spirit stains. More brilliant in color than oil stains, drying almost instantaneously and penetrating deeply, they are extremely fugitive to light and in light shades have to be expertly manipulated in order to prevent "lapping," that is, showing where one stroke of the brush overlaps another. Oil stains, too, referring more particularly to the aniline reds, are affected by light, but the fading is so gradual that in the course of years it is scarcely noticeable, except possibly on front doors, window casements, etc., where they receive the sun's rays direct. If a red mahogany finish is desired at these points a water stain alone will prove permanent.

Much time and guesswork on the part of the builder will be saved by securing from some reliable wood-finishing supply house a set of panels composed of various woods popular for interior trim, stained in current mahogany, walnut and oak effects. A model set would include by way of sample one each of brown, brownish-red, rich red and deep red mahogany on birch and gum, light, medium and dark walnuts on the same woods, several browns, a gray and a greenish-gray on oak, weathered oak on pine, etc. Either the portable small panels of the manufacturer could be used or for office purposes a set finished by the manufacturer on shaped lumber supplied by the builder, directions to be pasted on the backs.

Where the woodwork is to be stained there is a choice of two types of protective finish, either the wood may be shellacked and waxed or it may be shellacked and varnished. When varnished, it may be given one or two coats and left in the gloss, dull rubbed with pumice and oil or flat varnished. The first named procedure has somewhat gone out of style owing to the prevalence of dull finished furniture, and the second is so expensive in labor that it is customarily duplicated not only successfully but much more economically by the third method. Flat varnish also has the virtue of closely approximating a waxed finish, giving the same soft lustre

and offering more durable protection.

While the wood trim is still in the white, it should be very carefully conditioned, that is, sanded down to a hard, dry smoothness and rendered free from lime spots, grease stains or other imperfections. Most of these latter will yield readily to a washing with benzine; any cracks, crevices or nail holes should be puttied up with plaster of paris, plastic surfacer or any similar preparation capable of absorbing and being colored by a stain. When the wood has been so prepared and dusted off it is ready for staining.

The stain itself, when of the oil or spirit variety, should be laid off with a soft haired brush, using steady, even pressure and taking care in the case of the latter to avoid lapping. When water stains are used, it is best to sponge the wood with water, thus raising the grain in advance. As soon as dry, sand down smooth and apply the stain, preferably warm if the wood is hard, and where the grain raises a second light sanding will be necessary. The brush should not be allowed to carry too much of the stain—for any type of staining, a flat wall brush 4 to 4½ in. wide is generally preferred. To insure a more even tone in the finish color, particularly in the case of the oil stains, it is well to wipe off lightly while the stain is still wet. By wiping a little harder this method may also be employed to make the stain appear lighter in color or to "high light" it in spots for antique effects.

Filling the Wood

The next step in finishing depends on the nature of the wood. If it is of the open grained variety, such as mahogany, walnut, oak, ash, chestnut, elm or butternut, a good filler must be employed, unless an antique, open pore effect is desired, of which more later. The purpose of wood filler is to level up the fine lines and checks with the rest of the wood surface so that the ensuing varnish or shellac coats will not fall into them and give a "pitted" appearance. The best fillers come in paste form, are reduced to creamy consistency with benzine, brushed on lengthwise with the grain and when set, wiped off with rags or burlap crosswise to it. Practically none of the filler is thus left to cloud the already stained surface, but enough is packed into the pores to dry flush with it.

Where oil stains are used it is usually desirable to precede the filling with a thin wash coat of shellac or shellac substitute, as there is danger that the wood filler with its linseed oil base might soften and wipe up the stain, producing a muddied, unpleasant effect when dried out. Wood fillers come in various colors appropriate to the finish, red and brown for mahogany, light brown for walnut, black for early English and antique, colorless for natural finishes, etc. There are so-called liquid fillers on the market, but their use is not recommended.

To return to the wood, if it is close grained and therefore requires no paste wood filler, the next step after staining is the application of a coat of shellac, white for the lighter, orange for the darker finishes. This shellac coat, which should not be too heavy, does whatever filling may be necessary and at the same time acts as a sealer over oil stains, preventing any affiliation between the oil there and that in the varnish. Were the varnish to come in direct contact with this type of stain it might remain "tacky," i. e., incompletely dry.

Over aniline stains, particularly the reds in oil and water form, this shellac coat is also a means of preventing "bleeding." So strong are these aniline colors that they have been known to penetrate through succeeding coats of filler, varnish, primer and enamel, forming a discoloring pinkish blotch long after its original application.

A good example of panel treatment in a dining room. Note the rich effect of the antique mahogany water stain and the soft luster of the dull rubbed varnish

Interior Varnishes

Varnishing is too well known an art to require extensive description here and the various types suitable for use on interior woodword have already been mentioned. A word or two as to quality might not be out of place, however, especially as the government has thought the subject important enough to lay down definite specifications. A proper trim varnish, according to Uncle Sam, is one suitable for all interior uses except on floors. Unlike the paint specifications, no formula is laid down, the manufacturer being permitted to use his own judgment as to raw materials and processes provided there is no question as to results.

The good interior varnish must be clear and transparent; it must flow out well under the brush and work easily. It must not run or sag, whether the surface be horizontal or vertical; must "set" to touch in four hours, dry hard in 24 (without pitting) and be in proper shape to rub in 48 hours. There should be no whitening or other bad effect from being drenched in water and no cracking when applied to tin and bent or sweating following rubbing. The tests sound more severe than they really are, for practically any good recognized brand of interior varnish will stand up under them.

The only object in mentioning the government's interest in the matter is to impress upon the reader who builds the eternal value of quality. Uncle Sam is a great user of paint and varnish, for carrying no insurance he has a healthy appreciation of what surface preservation can do to take its place. As a consequence a great many people are constantly trying to sell him his tremendous requirements, and as a matter of defense he sets up basic specifications which admit only quality products for consideration. The builder can hardly be expected to surround himself with retorts and test tubes merely to make sure he is not being victimized, but he can buy of manufacturers of established reputation and willingly pay the fair price that goes with demonstrated merit.

But even the best articles, varnish included, can be abused by improper application. Rushing the work, i. e., piling on one varnish coat over another incompletely dry can be avoided, so can omission of the shellac coat, the use of cheap liquid fillers and other sins which induce varnish troubles, often wrongfully blamed on the maker. This is sometimes demonstrated in the case of flat varnishes, many of which contain compounds which settle in the bottom of the can. Failure to stir up the contents before pouring out into the cup leads to streaky work, half glossy, half flat, that could easily be avoided by more scrupulous attention to the printed directions and notices.

(To be concluded)

Of General Interest

Model home erected on the Sherman Plaza, in Washington, D. C., for "Better Homes" Demonstration Week

Pullman cars being charged with electricity for operating their lights and fans, by farm lighting plants, during the Shriners' convention in Washington

Most Talked of House in America

THIS is the term applied to the house erected by the Home Owners' Service Institute of New York as a model for "Better Homes" demonstration week in June. The July NATIONAL BUILDER contained an article describing it in full, but at that time the house had not been completed. This house is a replica, modernized, of the old home of John Howard Payne, the author of "Home, Sweet Home," whose memory it commemorates. The architect, Donn Barber, accommodated his plans to the Department of Commerce's Dwelling House Code, which was drawn up with the idea of bringing about economy in dwelling house construction, but at the same time insuring the use of durable tested materials. The house is the property of the General Federation of Women's Clubs, to whom it was deeded by the builders. It will be used for demonstrating modern ideas in home economics by the Federation acting jointly with the Department of Agriculture.

The Fine Arts building, Chicago, as it is today

Meeting the House Shortage

THE present building boom seems to have curiously affected the sub-conscious of our authors, whose titles should go far to relieve any housing shortage. This season's offering in houses, augmented up to date, stands as follows:

"The House of the Secret," by Claude Farrere.

"The House of the Beautiful Hope," by Robert S. Christie.

"The House of Yost," by George S. Schock.

"The Forcing House," by Israel Zangwell.

"The House on Smith Square," by the author of "The House on Charles Street."

"The House by the Windmill," by Agnes Edwards Rothery.

"The House of the Fighting Cocks," by Henry Baerlein.—Keith Preston in *The Chicago Daily News.*

To Restore Old World's Fair Building

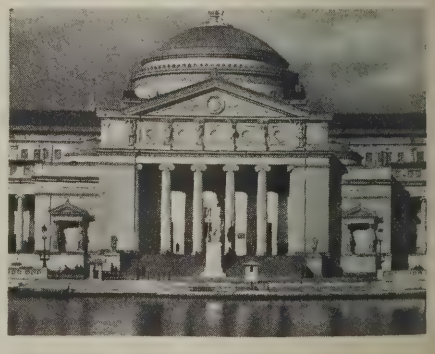
A MOVEMENT is on foot in Chicago to restore to its original condition and appearance the old Fine Arts building situated in Jackson Park. This building was one of the principal features of the great world's fair held in that city in 1893. The building was the work of the eminent architect, Charles B. Atwood, and it has been pronounced by authorities as the second most beautiful building in the world, the Parthenon at Athens being first. It is in the classical style. While the building is of sound construction throughout, its exterior details have fallen into decay and it is these features that are to be restored.

Farm Lighting Plants Charge Pullmans

DURING the Shriners' convention in Washington, D. C., June 2-9, it was necessary to use 400 Pullman cars for hotel purposes. This necessitated charging the batteries that furnished the light and power for the fans in these cars every day. For this purpose 130 "Farmelectric" lighting plants, with a capacity of 1½ kilowatts, were installed between the tracks on skids, each machine charging three cars at once. These plants are ordinarily used for lighting farms, country homes, stores, etc.

Hobo, Carpenter, Author

NELS ANDERSON, author of "The Hobo" (University of Chicago Press), a book held in high esteem by sociologists, was once a hobo or "migratory worker" himself. He learned carpentry and paid his way through the University of Utah working at that trade. He is proud of his knowledge of the building industry, and a host of workers who gain their livelihood in it.



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The Fine Arts building as it was during the World's Fair

TWO COLUMNS OF COMMENT

THIS is the "Homes and Apartments" number of NATIONAL BUILDER. In other words, an issue devoted especially to residential construction. The reason for it is because the readers of this journal do more of that kind of building than of all other kinds combined, and it is fitting that special attention should be devoted to residential construction in at least one issue of the year. Furthermore, according to the latest statistics, 46.1 per cent of all buildings constructed in the United States for which permits were issued in 1921 were "residential"; i.e., one- two- and multi-family dwellings, hotels, lodging houses, etc.; and 59.6 per cent of all money spent in building went into residential construction. The same authority states that residential building is catching up on itself, as it must do in order to overcome the slump caused by the war, and is outdistancing non-residential work. From these facts it is apparent, then, that the average contractor and builder will find the best market for his services for some time to come in the homes' and apartments' field.

THERE is another significant point to be considered in this connection and it has to do with the apartment house. It is stated that about one-fourth of all new family accommodations being built today are in multi-family dwellings; that is, duplex houses of one kind and another and flats or apartments. The trend toward this type of construction is reaching even the smaller towns and is no longer confined to the larger cities and congested districts. This is a fact that must be recognized by the contractor and builder, who should take steps to make himself familiar with apartment house design and construction. To assist the readers of NATIONAL BUILDER to this end, this issue contains a wide variety of material pertaining to multi-family dwellings, not only large and small apartment buildings, but also two-family houses of different types.

SOME readers will feel that this trend toward the apartment house just referred to is a getting away from what is commonly referred to as a distinctive American trait—home ownership. This may be true and, in so far as it is true, it is to be deplored. On the other hand, it must be frankly admitted that there is such a thing as a family honestly preferring to live in an apartment instead of an individual house. It must also be borne in mind that the apartment graduates many families into the home-owner class. It is often a transitional dwelling place that is of service while the family can save up money for a home of their own or they live in it while their own home is being built.

WITH these thoughts in mind, then, may it not be possible that there is a need for a small or medium or large apartment or at least for some two-family dwellings in your own community right now? Could you not make a profit and at the same time serve your community well by building one or more of these buildings or promoting their construction at this time? It is a suggestion worth considering and is party responsible for this particular issue of NATIONAL BUILDER.

KINKS From the Job and Office

By V. L. Sherman

For months and months readers of NATIONAL BUILDER have been sending in "kinks" for discussion in these pages and probably have been wondering who this chap, V. L. Sherman, is, who passes on their contributions, O. K.'s each one accepted and orders $5.00 be paid to the subscriber who sent it in. Consequently we asked the "kink" editor for an account of himself and this is what he wrote: "Deposition: Born in Minnesota, of American stock. Always regarded Scandinavians highly, one in particular. Brought up in native state, Washington, Michigan and Illinois. Studied engineering at Lewis Institute and University of Illinois. Best degree ever taken was the 52nd parallel. Outclassed in the war so had to go to work for the navy. Been on the engineering faculty at Lewis Institute, Chicago, the greater part of fifteen years. Most congenial occupations fathoming technical problems, steamboating and rebuilding plans. Enjoys friendships with architects and builders. Prefers union workmen from the smaller communities and houses that have plenty of draft and not too much superstructure." We had the picture snapped one day when the "kink" editor was in the office. It was impossible to get the pipe out of his mouth. All joking aside, readers of NATIONAL BUILDER who do not take advantage of "Vic" Sherman's technical help in their building problems are overlooking a good bet. Send in your kinks—give the benefit of your experiences to the other fellow as well as get the benefit of his. And remember, NATIONAL BUILDER pays $5.00 for every kink Sherman orders published.—The Editor.

Cutting Off Roof Truss

"IN a manufacturing plant not long ago," writes R. W. O., of Passaic, N. J., "a conveyor was installed to lift manufactured goods from a weave shed to the third story of an adjoining building. In order to erect the conveyor a hole had to be cut through the roof of the one-story building, and a housing erected over the opening, extending same up to the third-story height. The only obstacle was that one of the roof trusses of the one-story building came exactly in the center of the proposed opening, and it was necessary to cut off about 3 ft. 6 in. of the truss. The method employed may be of interest.

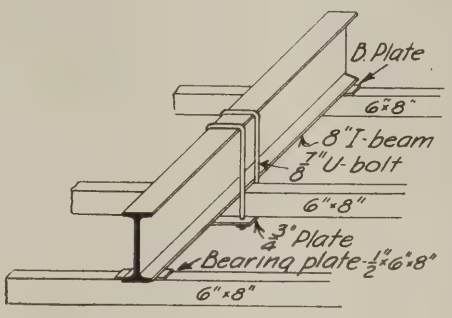


Fig. 2—Carrying center truss on I-beam

"The roof trusses were similar to the one shown in Fig. 1, and were placed 8 ft. on centers. In order to cut off one truss it was necessary to carry it from the trusses on each side. Therefore on the bottom chord of each adjacent a ½ in. plate, 6x8 in., was set as shown in Fig. 2, and an 8-in. I-beam was run through the three trusses, bearing on the outside pair. Two U-bolts, ⅞-in. diameter, were then dropped over the I-beam on opposite sides of the truss to be cut, and a ¾-in. plate, drilled to suit, was placed under said truss, and the bolts passed through and made fast. The center truss was thus carried by the I-beam.

"Then block X was set between the top and bottom chords, forming a sort of end post or strut. Next 1¼-in. holes were bored through the top and bottom members of the truss, and two 1⅛-in. adjustable eye-bars were bolted fast to the truss, one on each side, using a pair of 1¼-in. bolts as pins. The turn-buckles were brought up taut. The hole in the roof was then cut and the truss cut off as shown. No movement or change in the shape of the truss was visible, and the housing was erected as desired."

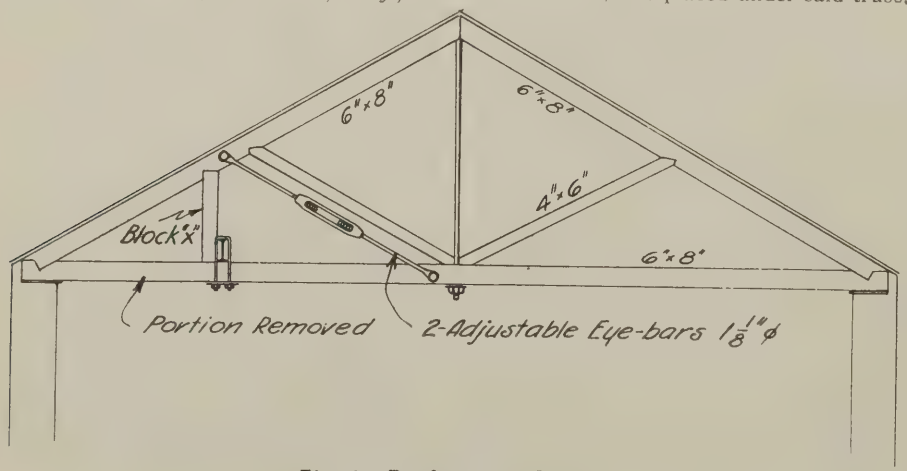


Fig. 1—Roof truss to be cut

Fault and Remedy in Diagonal Sheathing

A. J. H., of Madison, Minn., says: "This is not an argument for or against diagonal sheathing, but merely calls attention to a detail overlooked by many builders who use diagonal sheathing.

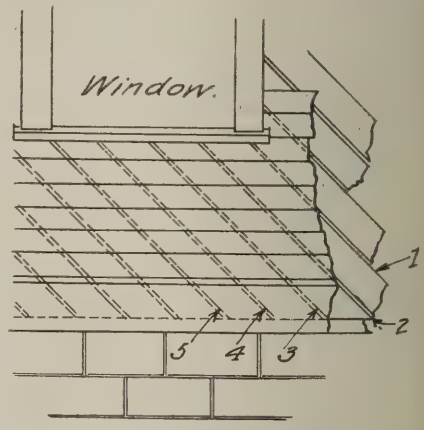


Fig. 3—Closing air lane

When same is put on and boards allowed to run out at bottom to lower edge of sill, as most builders do, there is an open air lane along the joints of the boards, as at 1 and 2, Fig. 3, which allows air to pass up to windows and doors and causes drafts. This, of course, is more marked with boards than with matched flooring or shiplap, but the shrinkage will make a very pronounced air lane even with matched stuff. Nailing a strip at bottom of sill and then butting sheathing boards to that will overcome this defect, as outside base covers and makes tight joint, and closes the air lane as shown at 3, 4, and 5.

"This defect not only causes drafts at doors and windows but, if not back-plastered, allows air to enter between outside and inside walls all over, making building that much colder, and allows moist air back of siding and may cause paint to peel."

About Doors

J. H. M., of Richmond, Ind., writes: "Recently in finishing a Colonial house using window and door casings with a backband finish I had the mill make a ⅜-in. tenon on end of casing and mortise

Fig. 4

head to fill. It makes a much better job, holding the wood even, saving time scraping down joint and the end of casing is already cut. Using a little glue will make it still better. (See Fig. 4.)

"I always cut my casing and door jambs to length on a bench using an iron mitre-box. Gain the side jambs into head, which makes jambs and casing same length. I used to make the heads on the job, but being short of help on the last job. I had them made at the mill, which I think is better."

Freer Septic Tank Inlets

F. C., of Plymouth, N. H., sends a suggestion regarding the inlet pipe of a septic tank. "All articles I have seen on this subject call for the outlet above the inlet, which, of course, causes the water to rest back considerable distance in the inlet pipe as per sketch. See Fig. 5. This

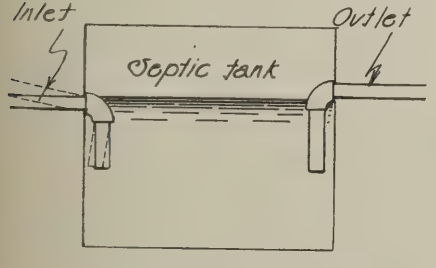


Fig. 5—Septic tank inlets

water backed up in the inlet takes so much force to flush the sewerage into the tank that an easy flow from the sink collects in the inlet pipe. A short, quick drop at the tank in the inlet pipe overcomes this difficulty, and quickens the flush into the tank, as shown on the sketch by dotted lines."

Since grease from the kitchen sink clogs the soil pipe if admitted to it before passing through a grease trap, and is just as likely to clog any pipe, some means must be provided to separate the grease from the discharge before it enters the sewer. When adequate space is not provided outside the house and below the sink, lead grease traps may be used. To make separation of grease from water certain, a chilling jacket is sometimes required. Is there any criticism to offer on the foregoing sketch or article?

A Water-Proofed Gutter

IN connection with Fig. 6, C. P. B., of Camden, N. J., writes: "I send you this account of a small job I had recently, somewhat out of the ordinary. I had been notified by a client of a complaint from the Board of Health to have corrected a leak from a defective gutter causing waste water to flow into a cellar of an adjoining

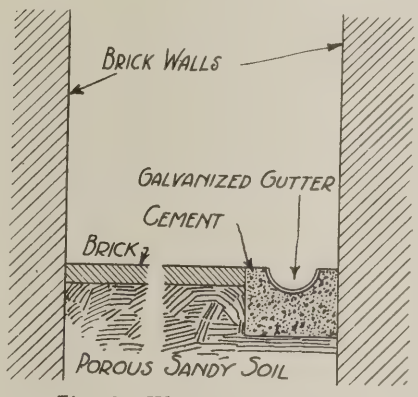


Fig. 6—Waterproofed gutter

property, same to be corrected within five days.

"The difficulty seemed to be to keep the running water off the cement until same would have a chance to set. I obtained ordinary hanging gutter, using it as a form for the cement as shown. It will be left there and when it has rusted away will still have a cement gutter in its place."

It might be added that with the rust to wash over it the gutter will be about as permanent a piece of cement in time as it will be water-proof.

Setting a Window Frame in Stone or Brick

THE following relates to the use of a dead-man in setting window-frames in stone or brick walls. The letter and sketch, Fig. 7, are from C. R., Chester, Pa.

"Setting a window frame on a stone or brick wall the right distance from the floor is rather a task. Often times a piece of wood of suitable length is cut and used to level from. Sometimes this is held out of plumb and the result is not the right level from the floor.

"A way to overcome this is to make what we call a dead-man. Cut a piece of 1x6-in. the right length from the floor to window sill and nail a small triangular brace on each side, keeping the bottoms

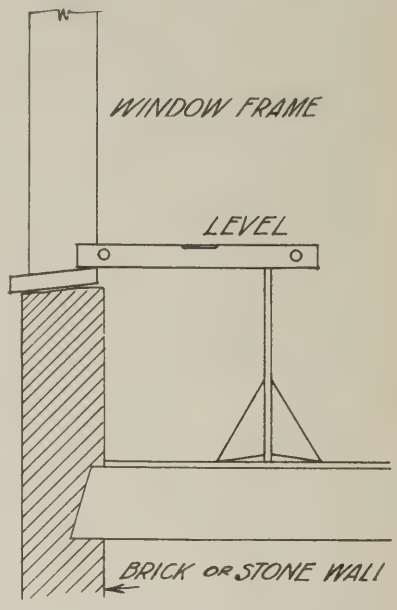


Fig. 7—Dead-man for leveling window frames

flush. This will stand perfectly plumb. It is also very helpful when one man is leveling the window frame. He can just set the level on the dead-man and one side of the frame, making that side level and then leveling across the frame."

Efflorescence on Brickwork

R. N. W., of Mt. Vernon, N. Y., writes to inquire about the white efflorescence appearing on brickwork, whether it comes from the clay of the brick or from the lime used. Inquiry among chemists seems to point to no certain conclusions, except that it will appear in damp weather or on bricks near a flue. In his handbook Kidder has said that there are at least three different substances which may cause it. "Of these carbonate of soda is the most common upon new work, after the lime stains have been removed. This is due to the action of lime mortar upon the silicate of soda in the bricks. Silicate of soda seldom occurs in brick unless the clay used is a salt clay.

"The only other white efflorescence of importance is chiefly composed of sulphate of magnesia. This is due to pyrites in the clay, which, when burned, gives rise to sulphuric acid, and the latter unites with the magnesia in the lime mortar.

"The above results from actual examinations by Mr. Samuel Cabot, chemist. The conclusions arrived at are these:

"1. The efflorescence is never due to the bricks alone, and seldom to the lime alone.

12. To avoid it, the bricks should be covered with an oily preservative capable of keeping the salts from exuding. Linseed oil cannot fill the requirements, as it is injured by water."

The above inquiry and another from J. J. M. brings to mind certain discussions the writer has been mixed up in lately regarding the protection of brick and concrete walls, namely, waterproofing. If a brick is glazed perfectly it is proof against efflorescence because it is in its own little glass case. If the glazing is not perfect, or if the brick is not glazed, the writer has the notion that vapor pressure, evaporation, heat or a good many other things might cause it. As Kidder says, the solution is, "protect the surface and you save all." One firm advertised that its product would prevent efflorescence when applied to brick, and soon after consulted a chemist to know why it didn't. The answer was that it was not waterproof. This brings us to the inquiry of J. J. M., who wants to know if powdered iron when applied to concrete will waterproof it, and why.

To waterproof a wall you must plug up all the holes. If you apply iron dust in such a way that it will get into the minute holes in concrete those particles of iron exposed to the air will rust, that is, oxidize. In oxidizing the volume of the iron increases nine times, and so I should say the holes are effectually plugged. As the rusted iron wears off that under it is oxidized, and so you have a certain depth of oxidized iron filling the holes in the wall.

Floating Star-Drill Dust

MANY times we stumble over our own feet in our efforts to do something. H. H. S., of Emporia, Kan., suggests removing the impedimenta when holes are drilled in concrete floors. "Many mechanics experience difficulty when drilling holes in concrete floor with a star-drill. If the drilling is done dry the accumulation of dust soon forms a cushion for the drill and thus retards the progress of the work. This can be overcome by using water. See Fig. 8. The water carries away the particles of dust as it is broken up by the drill. The objection to using water is that

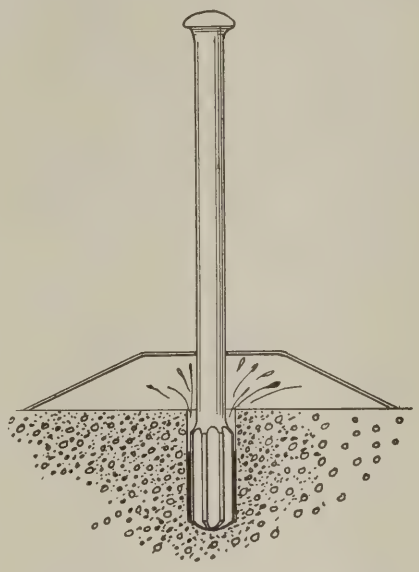


Fig. 8—Star drill with shield

it spatters too much, but that can be eliminated by placing a tin shield over the hole. The shield must have a hole in the center to receive the drill. An old pie tin or any such shaped tin will do. The drawing shows a tin taken from the end of a roll of rubberoid roofing, which is exactly the shape needed."

Duplex House Porch and Hall Lights

FROM R. P., of Vicksburg, Miss., we have: "I am submitting to you a solution of a problem regarding hall lights in duplex houses, as shown in Fig. 9. Everybody knows that in two-apartment houses this question always comes up. This solution can be used equally well for a two-story duplex or one-story double house, using the same hall for entrance. With this solution there is no possible way of disputing whose light is burning or who pays for it, as each tenant controls his own lights with separate switches."

Why couldn't a similar arrangement be used employing one lamp in place of two?

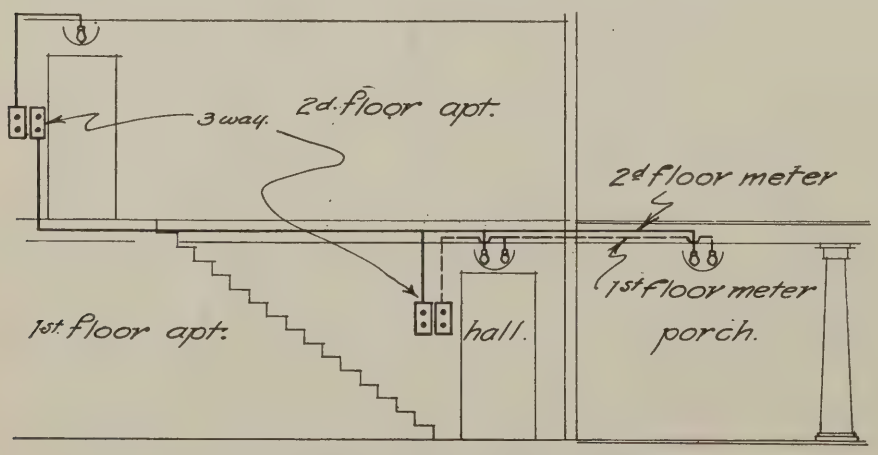
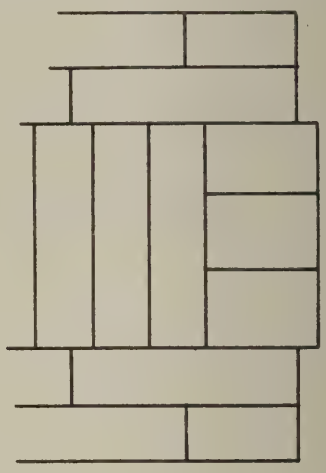


Fig. 9—A suggestion for wiring a duplex house

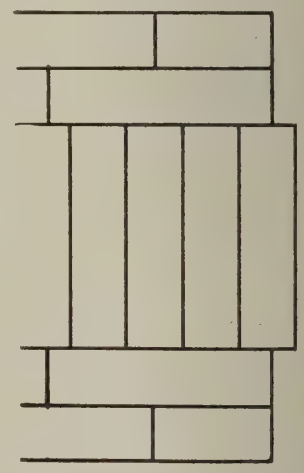
Corners of Soldier Courses

WHEN a soldier course runs to a corner it is always advisable to place three half-brick lying flat as shown instead of a single brick at the corner. A brick on edge



FLAT AT CORNER.

at the corner makes for very weak construction and may cause some damage in case it should fall out. There is little mortar surface in the corner brick of a soldier



SOLDIER AT CORNER.

course and the small base of a brick on edge does not provide sufficient stability, especially if the soldier course be projecting.

If the three half-brick be used, a firm base is assured as well as a greater mortar surface, and the corner is not apt to be knocked out, as often happens when a single brick is used. The three half-brick do not at all detract from the appearance of a face-brick wall.

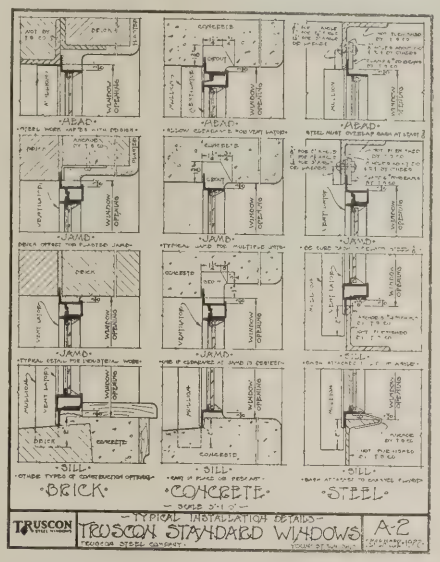
For the Builders' Library

"Outside the House Beautiful"—A collection of exterior views showing the surroundings of the home, by Henrietta C. Peabody. This book is one of a group pertaining to the "House Beautiful," and issued by the publishers of the magazine of that name and containing reprints from the magazine. Other titles are "Inside the House Beautiful," "What Makes the House Beautiful, etc. The present volume treats of the foundation planting, garden beds and borders, hedges for ornament and utility, the garden path, the gate, stone walls and fences, vines and their uses, pools and fountains, and garden ornaments and accessories. The illustrations are tastefully chosen and there are many of them. Every contractor, architect and builder knows how much attractive surroundings can add to a house, but sometimes it is a problem to know just how to obtain such surroundings. This book gives many suggestions and is well worth owning. It is 9½x12½ in size, contains 70 pages, and is bound in heavy board. Price $3. The Atlantic Monthly Press, publishers, Boston, Mass.

"Home Building" is the title of a recent book by Dwight L. Stoddard, 354 West Raymond Street, Indianapolis, Ind. Mr. Stoddard is a builder, writer and authority on the steel square. "Over 200 illustrations; as plain as print; the entire subject can be grasped in a glance, so therefore little need of printed matter." Thus runs Mr. Stoddard's own description of the book, which expresses the case very well. The book sells for 50 cents.

"Architectural Uses for Wood."—Advantages of frame construction, with particular reference to the wooden house, are effectively and interesting set forth in a series of nine attractive little pamphlets entitled "Architectural Uses for Wood—the Indispensable Material," prepared and published by the Southern Pine Association, New Orleans, La., for free distribution to the public, either through retail lumber dealers or by the Association direct. The following sub-titles of the nine brochures indicate some of the phases of the main subject dealt with: "The Homey Quality of Wood," "Wood, the Great Civilizer," "Skilled Woodworkers Always Available," "Strength, Safety, Permanence in Wood," "Advantages of Hollow Wall Wood Construction," "Utility and Beauty of Wood," "Economy of Wood Construction," "The Colonial Home of Wood," and "Wood for the Interior of the Home."

"Drafting Room Standards for All Types of Steel Windows" is the title of a voluminous loose-leaf portfolio just issued by the Truscon Steel Corp., Youngstown, Ohio, to architects, contractors and engineers. This portfolio answers practically every question the builder can ask about steel windows and answers them graphically. The architectural detail sheets, which



A typical page of details from portfolio on steel windows

are 7x9 inches, are drawn to scale for tracing on plans. A folio of complete specifications is included, covering practically every type of steel window and industrial steel door. New sheets, it is stated will be supplied from time to time so that the portfolio can be kept up-to-date.

"Shope Concrete Brick": Its Origin, Uses and Methods of Manufacture—Shope brick are concrete face brick manufactured under the patents of D. F. Shope. "The basic principle of these patents," says the catalog with the above title, "is to so engage the three natural elements of which concrete is made, cement, fine sand or gravel, and water, in such a manner as to form a natural concrete stone, which is used extensively as a building material." The machinery for making these concrete brick is sold by the Shope Brick Co., Portland, Ore. It is claimed that it is possible to regulate the size of the brick made by these machines to 0.0005 in., and that Norman tile brick can also be made. The company states that the Shope process produces an impervious face brick in an unlimited variety of colors and finishes, yet one with a body of sufficient absorption to give a perfect bond with the mortar.

"Ventilation"—Report of the New York State Commission on "Ventilation." This commission was organized June 13, 1913, and was endowed by Mrs. Elizabeth Milbank Anderson. In order to give it necessary power and prestige, it was made a quasi-official commission appointed by the governor, but serving without expense to the state. The personnel was composed of a biologist, a physiologist, a psychologist, two public health experts and a practical engineer. Its purpose was "a determination on the one hand of the atmospheric conditions most favorable to human health, comfort and efficiency, and on the other of the most efficient and economical practical methods for securing such conditions." The commission made an exhaustive study of the necessary conditions for successful ventilation by windows alone, by window inlets with gravity exhausts, by window supply and fan exhaust, and by plenum supply and gravity exhaust. The report closes with this unusual statement: "The most important article of ventilating equipment is the thermometer; and however simple or however complex an apparatus may be installed for air conditioning, a constant and intelligent vigilance in regard to operation and over-heating is the price of health and comfort." The commission's investigations were mainly in connection with the ventilating of school rooms but many of the principles that apply there are also applicable to the ventilating of residences, theaters, factories, offices, and other closed spaces in which human beings are confined for any period of time and in varying numbers. The book belongs in the technical library of every first-class contractor, architect and builder. It is 7x10¼ in size, contains 620 pages, and is bound in blue cloth stamped in gold. Price $15. E. P. Dutton & Co., 681 Fifth avenue, New York City, publishers.

"Country Homes."—This interesting plan book is from England. It is edited by Capt. G. C. Clark, founder and late editor of "The Ideal Home," and is published by Country Homes Plan Department, 526 Oxford Street, London, W. 1. It contains 76 pages of text with plans and designs for 50 houses, suggestions for interior treatments, designs for doors, windows, fireplaces, cabinetwork, and suggestions for laying out the garden. As might be expected, the entire book is distinctly English in flavor. The designs for the houses are, in the main, splendid and are much better than the artist's pen and ink rendering of them. The book sells for 4s. 6d. net. American contractors and builders will get many suggestions from its pages.

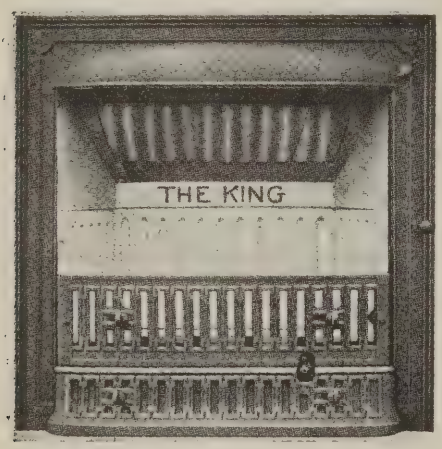
Among the Manufacturers

New Devices, Methods and Improvements in the Building Industry

Fireplace Grate Adds Value to a House

THE prospective home owner is quick to appreciate the additional value that a fireplace grate adds to a house or apartment when it is pointed out to him that with a fireplace he can materially cut down on the length of the season for running the furnace and at the same time bring coziness and cheer into the family circle by a warm grate fire.

The King Mantel & Furniture Co., 305 Gay Street, Knoxville, Tenn., manufactures a line of mantels and fireplace equipment that is full of attractive designs and practical devices. "The King" mounted grate, one of their most popular items, is illustrated. It is furnished in both 20- and 24-in. sizes, and in a wide variety of finishes. The sides are of heavy grooved fire brick and there is a shaker bottom operated by a handle for the rod visible between the first front and ash screen. A summer front is furnished. A damper permits regulation of the heat and by closing slides in the fire front and ash screen the fire can be kept all night. The grate burns soft or hard coal, wood or coke. The outside dimensions of the 24-in. grate are 30½x30¼ in.

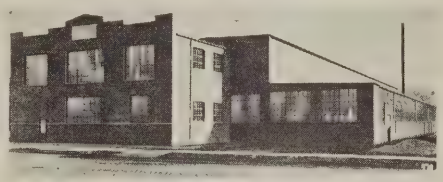


A fireplace grate for burning coal, wood or coke

The manufacturer's catalog illustrates in most attractive manner their entire line and detailed information is given for each article, including prices. "Clean pictures direct from photographs, plain facts, plain figures —a book you can understand"—and that is what it is. The book is sent free to contractors, architects, builders and dealers.

Moves into New Plant

WHAT is said to be the most up-to-date plant in the world devoted to the manufacture of concrete machinery and which is itself built of concrete blocks made by machines manufactured and sold by its owner has just been occupied by the Ideal Concrete Machinery Co. at 5000 Spring Grove Avenue, Winton Place, Cincinnati, Ohio. This concern has always claimed the distinction of being the first and only concrete block machinery makers owning their own machine-shop equipment and manufacturing their block machines. Two of the three original members of this firm were the patentees of what is said to be the first block machine embodying the principle of making a concrete block with the face down, the face plate being in the bottom of the mold; the first machine to make a block 16 in. long; and the first block machine that permitted the use of a richer facing material to be spread upon the face plate, the placing of the coarser concrete thereon causing a perfect amalgamation of the two component parts, by the process of tamping directly against the face plate.



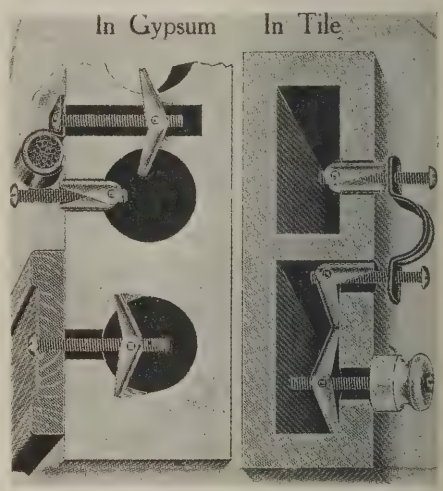
New plant of Ideal Concrete Machinery Co.

Establish West Coast Factory

OF interest to builders on the Pacific Coast is the announcement by Victor F. Dewey, president of the Detroit Steel Products Co., of the establishment of a factory at Oakland, Calif., for the manufacture of Fenestra Steel Windo-Walls. Construction of the first unit, a model factory building of concrete and steel sash, has been started under the direction of H. F. Wathen, Pacific Coast manager of the Fenestra Construction Co., a subsidiary of the Detroit Steel Products Co., which specializes on steel sash erection work. This unit will be in production by June 15, it is expected. Mr. Burleigh A. Lum has been appointed manager in charge of the Pacific Coast sales of the company, with offices at 251 Kearney Street, San Francisco. He was formerly director of Western agents for the company, and as such has a wide acquaintance among builders in the Middle West.

Toggle Bolts Permit Bolting to Hollow Walls

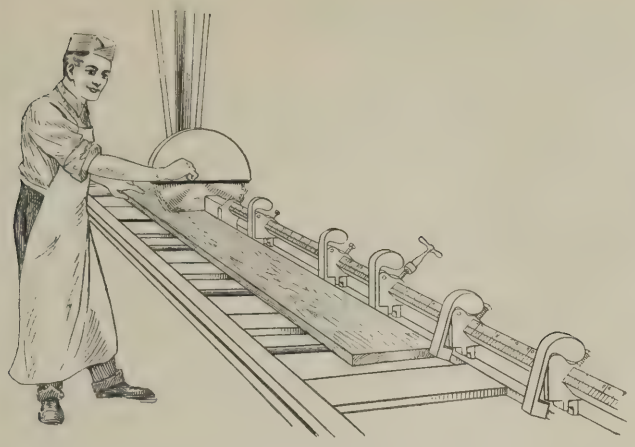
IT is easy enough to drive a nail or put a screw into a wooden stud, joist or floor, but what about fastening things to hollow walls of gypsum or tile? The Paine Co., 1742 West Van Buren Street, Chicago, manufactures a special kind of toggle bolt for this purpose which is extensively used by plumbers, electricians and builders in installing fixtures and various devices. A hole is bored in the hollow wall large enough to permit inserting the bolt and the toggle catch, which folds up for the purpose, and when inside the wall is immediately spread out by a spring between the two wings of the catch.



How Paine toggle bolts go into and hold in hollow walls

Changes Name

THE Master Woodworker Mfg. Co. is the new name of what was formerly the Woodworker Mfg. Co., 612 Brush Street, Detroit, Mich., according to an announcement by Louis de Linieres, general manager of the concern, who explains that the change is made "inasmuch as the previous name has always been confusing, people taking us for manufacturers of cabinets, etc., instead of manufacturers of woodworking machinery."



Automatic gauge, with stops at any points, permitting accurate and quick cutting by swing saw

Steel basement windows in home of G. C. Westcott, Detroit. B. M. Spring, architect and builder

Automatic Gauge for Swing Saw

PRACTICALLY every contractor and builder has at one time or another tried to rig up a set of guides for cutting pieces of the same length and of different lengths without having to measure and mark off each one before cutting. Such home-made contrivances are, however, rarely satisfactory. The Tannewitz Works, Grand Rapids, Mich., have put on the market an automatic gauge with stops that are accurately balanced and easily pushed back, allowing the operator to select any stop, thus cutting the various lengths accurately and quickly. The bar is graduated both ways for use on either side of the saw. The stops and brackets are of steel.

Making Sales Easier

IT is human nature that all of us prefer to do business with those we know best and to buy the articles we know most about. Contractors, architects and builders know from experience that it is easier to sell a client on well-known materials than on materials the client has never heard of or knows little about. The Richardson Co., Lockland (Cincinnati), Ohio, manufacturers of the roofing bearing their name, is taking advantage of this fact to assist dealers, contractors, architects and builders to sell their products by advertising Richardson roofing in an unusually aggressive campaign. Readers of NATIONAL BUILDER have already seen a number of four-color "inserts" by the Richardson Co. in this and other business papers, but these same or similar displays are appearing in newspapers and farm papers of general circulation to reach the general public—from which the customers of the contractor, architect, builder and dealer are recruited. This advertising lays stress on the principal talking points of the Richardson "Super-Giant" shingle (50 per cent thicker, 100 per cent more rigid and 35 per cent more economical in cost of laying than standard shingles and with absolutely exclusive color effects). Such an educational campaign should be of both direct and indirect benefit to the man in the building business, making sales easier for him. This same thing is true for all other well-known brands of building materials, accessories and equipment, and the prudent builder takes advantage of the selling value of these famous names to make his own sales easier.

Uses of Slate

THE National Slate Association, 757 Drexel Building, Philadelphia, are taking steps to make contractors, architects and builders generally better acquainted with the uses of slate. A booklet recently published lists nearly one hundred separate purposes to which slate is specially adapted; for instance, natural finish slate is used for walks and roofs, for lath, chimney tops, paving, etc.; smooth finish slate is used for blackboards, floors, wainscoting, soda fountains, hearths and mantels, toilet stalls, sinks, insulations of various kinds, counter tops, type cabinets, whetstones, swimming pools, etc.

"Slate," says a booklet recently issued by the association, "is a natural rock quarried in much the same way as other stone formations. But slate is the most workable of all enduring stones and may be used in more ways than any other natural rock. This is because of a quality peculiar to slate alone—perfect cleavage, by which large blocks may be split into great slabs or into sheets of any thickness even down to a few thousandths of an inch, without loss. . . . The density and compactness of slate give to it great hardness and strength.

Slate is tough and for this reason may be used in places where blows or accidents would crack or break other materials. It is insoluble. It does not stain, for it is impervious to water, oils and chemicals. It does not absorb odors. It is fireproof. The action of the elements have no effect on it. The surface of slate does not soften and its beauty is equal to its serviceability."

Modern Tendencies in Basement Windows

"THAT steel basement windows will fit into the architectural design of an attractive residence is amply proved by the photograph of the home of G. C. Wescott, 60 Puritan avenue, Detroit; B. M. Spring, architect and builder," says N. A. Harris of the Detroit Steel Products Co., Detroit, Mich., manufacturers of the "Fenestra" line.

"The real beauty of these steel basement windows lies in their simplicity. They are unpretentious and do not stand out noticeably, attracting more than their share of attention. Thus they produce that pleasing effect which can be secured only when each detail fits harmoniously into the design.

"Every contractor has felt the disappointment of seeing the beauty of a house he has designed some time before, marred by the dirty, discolored and battered appearance of its windows. Steel basement windows, because of their rigid strength, withstand severe usage, make for permanence and retain their neatness.

"Steel basement windows are constructed of narrow rolled steel bars, eliminating the wide wooden frames and members, and admit from 60 to 80 per cent more daylight.

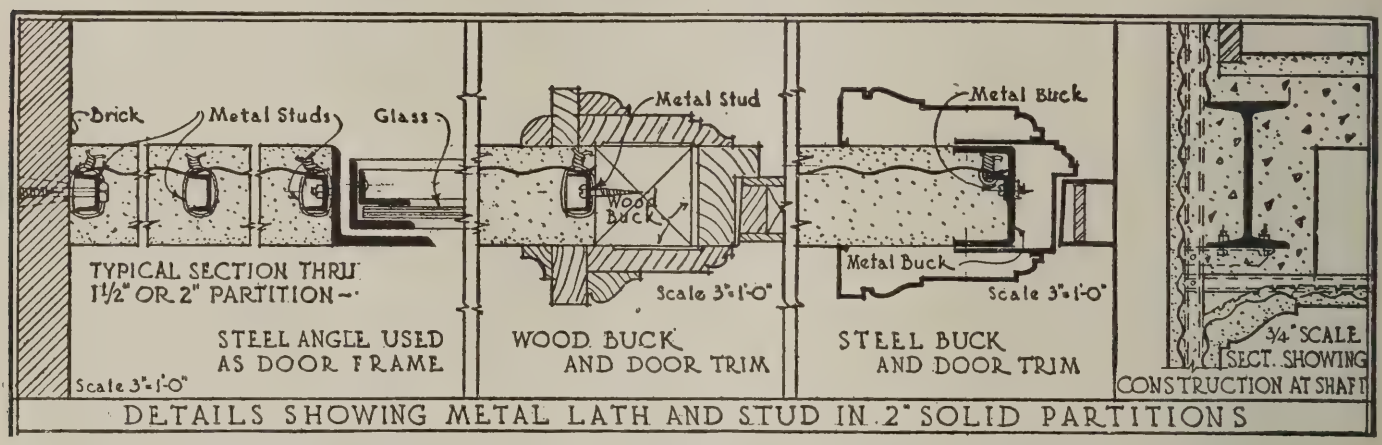
"A clean, well lighted basement makes an ideal laundry room. The large, easily opened ventilators in the steel windows quickly draw off the soapy fumes and steam of wash day. And then, of course, a corner of the basement for a work bench for the man of the house must not be overlooked.

"The good business judgment of the owner of a more expensive home urges him to secure the most from his investment by utilizing the spare room in his well lighted and ventilated basement. A very comfortable play room for the children on rainy days or a chummy den or billiard room may be installed at a very nominal cost.

"Every home owner has experienced the difficulty of trying to open a basement window that has warped and stuck. Steel windows are not affected by moisture and always open and close easily."

Specifications for Metal Lath Construction

FOR years the various manufacturers of metal lath have given out slightly conflicting specifications on the use of their products. In line with the recommendations of the United States Department of Commerce, through its Bureau of Standards, these producers have agreed upon a standardization of their products such as will insure equality of competition through basic cost and facilities for accurate inspection in the field. This standardization has reduced the 73 or more different styles, weights, gauges and combinations of lath to only 10 different weights distributed between expanded metal lath, flat rib lath and ⅜-in. rib lath. These specifications are approved by the American Specification Institute, and are the combined result of many months of investigation into the specifications of leading architects, inspection of actual construction in all parts of the country, research into scores of building codes, circulating questionnaires among contractors and composing the views of the competing manufacturers. The specifications have been issued in booklet form by the Associated Metal Lath Manufacturers, Wharton Clay, commissioner, 123 West Monroe street, Chicago, from whom a copy can be obtained. The illustration above is taken from this booklet and shows the construction of a solid 2-in. partition with metal lath and studs. This kind of partition is meeting with acceptance by leading architects and contractors generally. A 2-in. partition permits 4.5 per cent more floor area in a space of 33,000 sq. ft., and it is claimed that the relative intensity of sound transmitted through solid metal lath partitions as compared with hollow block partitions is considerably less.



Details taken from book of specification issued by the Associated Metal Lath Manufacturers

Machine for Grade-Marking Lumber

THE Southern Pine Association is having a machine perfected for grade-marking lumber at the mills so as to protect the buying public against deception and fraud.

Steel Shelving Now Sold by Building Supply Dealers

IT has been reported that The General Fireproofing Co., Youngstown, Ohio, has greatly increased their facilities for carrying stocks of materials of their manufacture in Chicago warehouses and that it is now possible to make shipment direct from Chicago on practically all standard products. This is particularly advantageous to the dealer who carries a minimum stock and also means quicker service to the building trade.

Another announcement of equal importance is to the effect that the G. F. steel shelving is now being carried in stock by many building supply dealers. This product in the past was marketed through their distributors for Allsteel office furniture, but a realization that steel shelving is now being considered as standard for many types of buildings requiring such facilities has prompted the manufacturers to consider it as a building specialty and, as stated above, in many cases, it is being carried in stock by their building material dealers who are thus placed in a very advantageous position by reason of their being able to furnish one more item in many bills for material.

Advise Fewer Sizes in Building Tile

AT a meeting held June 19, 1923, at the Department of Commerce, the Standards Committee of the Hollow Building Tile Association reported to the Department's Division of Simplified Practice the results of a survey which the association had made of existing varieties in types, sizes and weights of hollow building tile.

The survey showed 36 different sizes—each made in a wide variety of weights. The committee recommended the elimination of 23 of the 36 sizes and the retention of 13 as "standards" for the industry. A standard weight, with a permissible variation of 5 per cent over or under the standard weight, was also recommended for each of the 13 sizes retained.

The committee requested the Department of Commerce, through its Division of Simplified Practice, to call a general conference next October of manufacturers, architects, engineers, contractors and builders to discuss the general adoption and use of the recommended standard sizes and weights.

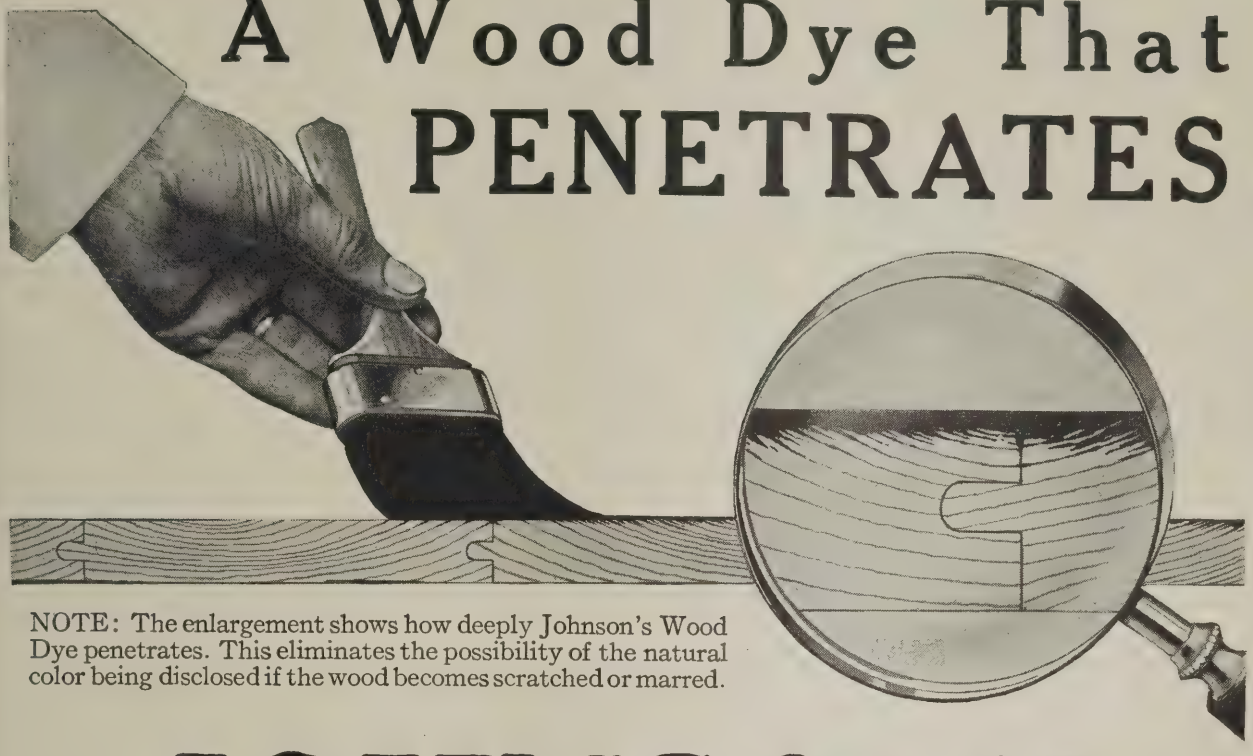
"This is another decided step forward in the Hoover plan to reduce the cost of building construction through the elimination of waste in industry," Ray M. Hudson, the Commerce Department's representative at the meeting, declared as the session closed.

Uniform Vacations Again on Upson Program

LAST year the Upson Co. of Lockport, N. Y., makers of Upson board, inaugurated the plan of all employes taking their summer vacations at the same time. It was so successful that this year the same program will be followed out. The entire plant will be closed during the last week in July and the first week in August and everybody, with the exception of a small skeleton organization to take care of emergencies and a repair gang which takes advantage of the opportunity to make necessary repairs in the mill. All employes, office and mill workers alike, are given vacations with pay, according to the length of time they have been with the company.

This scheme of the Upson company is also in vogue among several other big concerns. The claim is made for it that it avoids the disruption of regular work occasioned by the absence of a number of employes at various times throughout the summer, throwing more work on the shoulders of their associates in the hottest season of the year. The new scheme works hardships on no one; the trade is prepared for the shutdown and requirements are anticipated; a general state of chaos in the office is avoided and errors of many kinds prevented.

A Wood Dye That PENETRATES



NOTE: The enlargement shows how deeply Johnson's Wood Dye penetrates. This eliminates the possibility of the natural color being disclosed if the wood becomes scratched or marred.

JOHNSON'S WOOD DYE

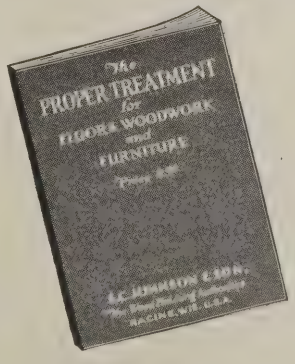
Johnson's Wood Dye is entirely different from the many wood stains and tints on the market. With it inexpensive soft wood such as pine, cypress, fir, etc., may be finished so they are as beautiful as hardwood. Its brings out the beauty of the grain without raising it in the slightest.

Johnson's Wood Dye is a ***dye*** in every sense of the word. It contains no finish whatsoever and, like most first class products, it answers one purpose only—it dyes the wood—the finish must be applied over it. We recommended Johnson's Varnishes or Polishing Wax.

Johnson's Wood Dye goes on easily and quickly without lap or streak. It dries in four hours and will not rub off or smudge. You will find Johnson's Wood Dye a big help in working out color schemes in stained woods. Johnson's Wood Dye is made in 15 beautiful shades, all of which may be lightened, darkened or intermixed. Full directions on the label.

FREE—This Book on Wood Finishing

It's the best book ever published on Artistic Wood Finishing—the work of the famous experts—illustrated in color. This book is written for the practical man—it gives covering capacity, includes color charts, etc. We will gladly send it free and postpaid. Use coupon at right.



S. C. Johnson & Son
"The Wood Finishing Authorities"
Dept. N.B.7 RACINE, WIS.

Please send me free and postpaid your Book on Wood Finishing.

I usually buy varnishes from.....

My name.....

My Address.....

City & State.....

Brick Cleaning Machine Perfected

FOR some time the Maroa Manufacturing Co., Maroa, Ill., have been working on a brick cleaning machine which they felt they could recommend to contractors and builders. They now announce the perfection of the "Eureka," a machine which they claim will do the work of five men. A special cast white iron has been developed for the cutting tool to remove the mortar from the bricks. It is claimed that the average cost to renew the cutting sections is 8 cents for each 1000 bricks cleaned. Under general conditions 3 hp. are required to operate the machine, but either a 4 hp. water cooled radiator type Cushman engine or 5 hp. New-Way air cooled engine is furnished. The air intake of the engine is equipped with dust cleaners. The clutch is provided on the engine pulley and the lever is within easy reach of the operator so that the engine can be disengaged when necessary. The manufacturers state that many contractors are making a specialty of cleaning brick with this outfit. They keep a watch for old buildings to be wrecked or where fires have occurred and buildings have to be torn down. With the present cost of brick and freight rates it means a big saving to be able to salvage brick. Further information about this machine is contained in Bulletin No. 26 issued by the manufacturers.

"Eureka" brick-cleaning machine, manufactured by Maroa Mfg. Co., Maroa, Ill.

Colonel Sawyer Appointed Secretary of the A. G. C.

COLONEL D. H. SAWYER has been appointed secretary of the Associated General Contractors of America to fill the place of Eugene Young, who recently resigned to enter business in Minneapolis. Born in Mt. Pulaski, Ill., Colonel Sawyer graduated in engineering from the University of Illinois and is a member of the American Society of Engineers. Going East after graduation, he was engaged in engineering and building operations for about a year when he returned to his native state, becoming city engineer of Paris. Later, as chief engineer of the Illinois Traction System, he had charge of the construction of most of the interurban lines of that company which connect the larger towns of central and southern Illinois.

In 1908 Colonel Sawyer joined his brothers in the Northwest, forming the firm of Sawyer Brothers, who, with offices in Seattle and Spokane, engaged in consulting and designing engineering work, covering fields of municipal improvement, irrigation, drainage and kindred work.

Summoned to Washington late in May, 1917, he was soon commissioned a major in the Quartermaster Corps and assigned as Construction Quartermaster to build the original Camp Grant. Upon the completion of this assignment and during the remainder of the war Colonel Sawyer was engaged in building a nitrate plant near Cincinnati, Camp Bragg, and in a supervisory capacity was in charge of construction of quartermaster storage projects throughout the East and Central West.

Following his resignation from the military service, he became associated with the James Stewart company, being engaged on various building enterprises.

Colonel Sawyer brings to his new position years of experience in the engineering and construction fields which peculiarly fits him for the secretaryship of the Associated General Contractors with its large opportunities for furthering the interests of the general contractors of the country.

"Save the Surface Magazine"

THE first issue of the new publication of the Save the Surface Campaign, 511 The Bourse, Philadelphia, Pa., has just come out. It is an attractive 16-page booklet, with special six-color offset cover, size 7x9⅝. It is printed in the manner of the popular rotogravure supplements to the Sunday papers and is abundantly illustrated, with the centerspread devoted entirely to photographs from everywhere.

The articles all deal with the preservation and treatment of all kinds of surfaces with paints and varnishes, some of them written by well-known bankers, government officials, etc.

"Save the Surface Magazine" is purchased by painters and dealers, and is sent by them to their customers and prospects. Space is provided for imprinting the dealer's name on the front cover. It is hoped that by the broad, unselfish editorial policy and the practical nature of the articles, the publication will prompt property owners to a greater use of paint and varnish.

Atlas Acquires Kansas Portland Cement Plant

THE letter quoted below is being mailed to the customers within the territory served by the Western States Portland Cement Co. at Independence, Kans., which property has been acquired by the Atlas Portland Cement Co. (of Kansas):

"The Atlas Portland Cement Co. (of Kansas) has been incorporated to acquire the property of the Western States Portland Cement Co. at Independence, Kans.

"The well-known quality and uniformity of 'Cowboy' Brand, which has heretofore been manufactured in Independence, is already established. The Atlas company will link with this quality the same dependable service which has been maintained for over a quarter of a century, which has resulted in their permanent clientele and which justifies the slogan that—

'Atlas is the Standard by which all other Makes are measured.'"

Roofing Manufacturers Discuss Shorter Lines

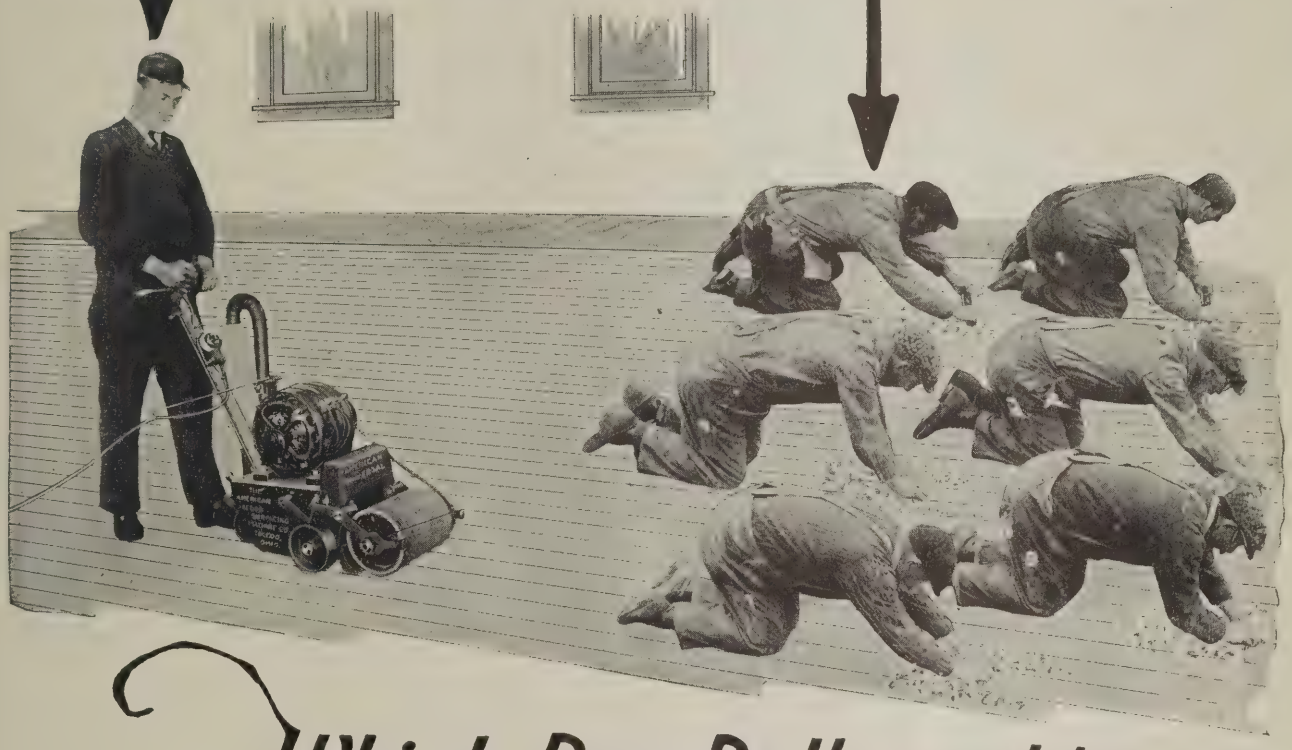
THE users of waste in the manufacture of roofing resolved to eliminate waste when the members of the Prepared Roofing Association at their recent meeting in Washington, D. C., approved in record-breaking time the advice of Herbert Hoover, Secretary of Commerce, who in an address had just recommended that they cut down the number of varieties of their products.

The association decided that 36 varieties of roll roofing now being manufactured mainly from waste material could be reduced to 7 and all needs would be met. Economies resulting from this policy promise ultimately to reduce the cost to every man who puts a roof on his house. On hearing of this action, Mr. Hoover told F. H. Hird, of Chicago, president of the organization, that other trade organizations had recently announced their intention of simplifying their lines of manufactured products, but none had done this so quickly as the prepared roofing manufacturers.

About 80 per cent of the roofing manufacturers of the United States were represented at the meeting and 7 out of 10 of the roofs made are of the kind of roofing they supply. In his address, Mr. Hoover said that one of the chief faults of the American manufacturing industry is that there are too many styles of products being put out and standardization along this line would bring a great saving for everybody.

"Statistical anticipation" is what the Department of Commerce desires in the preparation of trade statistics, Mr. Hoover said, in order that business men can better know what future conditions they will have to face.

SIX MEN OR ONE ?



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Common Brick Men to Meet in Los Angeles

THE enormous growth of the brick industry on the Pacific Coast is evidenced in the decision of the Common Brick Manufacturers' Association to hold its 1924 meeting in Los Angeles.

The directors of the association, meeting in Cleveland recently, voted unanimously to run excursion trains through to the Coast in early February for the accommodation of brick manufacturers and their families who will attend the annual meeting in Los Angeles the week of February 11.

With the unprecedented building program of the past few years in southern California, that section has become a brick producing center of the first magnitude, ranking only slightly below that of Chicago and the Hudson river. The Coast states are particularly successful in the brick industry through their co-operative efforts in advertising and promotion. California, Oregon, and Washington have practically a 100 per cent representation in the Common Brick Manufacturers' Association. These states have outdone many of the Eastern organizations in the magnitude of their advertising efforts.

According to Charles H. Bryan of Detroit, president of the Common Brick Manufacturers' Association of America, the high development of the brick organization of the Coast was a prime element in influencing the association to take the brick men of the East to Los Angeles in 1924. "We want to learn how they do it. We have been surprised to note that Los Angeles ranks next to New York and Chicago in the volume of its building permits month after month, and we know of the phenomenal success of the brick plants in all the Coast states."

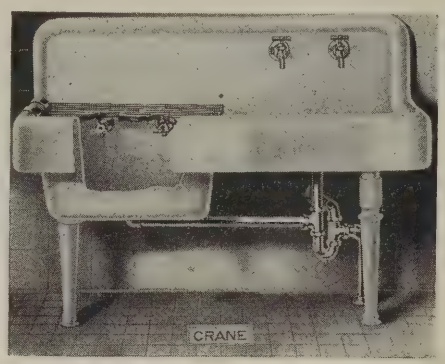
Special trains are being arranged with starting points probably at Albany, Chicago and Kansas City. An Eastern train will be consolidated with those originating in Chicago, and the Kansas City trains will consolidate with the Chicago trains at Denver. A day will be spent in the Colorado metropolis, during which a meeting of the brick manufacturers of that section will be held. The train proceeds in daylight through the Royal Gorge, and will stop for a day's sightseeing and business meeting in Salt Lake City. Another day in sightseeing will be spent in San Francisco. the trains arriving in Los Angeles in time for the opening of the meeting on February 11. The return trip will be by the way of San Diego, El Paso, San Antonio and Chicago.

The common brick association is arranging a rate for the brick manufacturers and families and friends that will include all transportation, Pullman reservation, meals en route, and sightseeing trips.

There will be one session daily, held at the Hotel Biltmore, on each of the first four days of the week.

Combination Sink and Wash Tub

IN spite of building rules and warnings from the owner or janitor, tenants in apartment houses will do some washing in their kitchens or bathrooms. Silk things, sox, stockings and such are not always to be sent to the laundry or put in the wash, and so the apartment house builder might as well recognize this fact and make the most of it. The Crane Co., 836 South Michigan avenue, Chicago, have put on the market a combination washtub and sink which offers a unique solution of this problem. The illustration shows the washtub part in section. It has its own hot and cold water faucets and when not in use is covered over by a drain board, as illustrated, which becomes an adjunct of the sink. This equipment is also useful in the small house.



A combination sink and washtub for apartments and small houses

Koehring Heavy Duty Pavers

KOEHRING COMPANY, Milwaukee, Wis., manufacturer of a well-known line of concrete mixers, pavers, crane excavators, draglines and shovels, has just published a catalog of its heavy-duty pavers which is especially attractive in make-up and complete in the information it gives concerning the equipment described. The book is 8x10¾ in size and contains 48 pages.

An interesting page in this book is that explaining the Koehring five-action remixing principle. This principle, it is claimed, produces uniform concrete in which every particle of sand and aggregate is so thoroughly coated with cement that the cement acts as a lubricant, the plastic concrete flowing and working easily without excess of water. Special Koehring heavy-duty features are heavy drumhead castings acting as flywheels and equalizing drum motion under variable loads, discharge chute pivoted inside the drum which alone makes possible the remixing action, and generous drum dimensions.

Specifications for the various equipment are given in detail for the guidance of the engineer or contractor.

Repairs Broken Concrete Floors in 48 Hours

"QUICKFIX," a new compound for repairing concrete floors that will produce a patch of flint-like hardness in 48 hours, has recently been developed by the Master Builders Co., Cleveland, Ohio. When used according to the method specified by the manufacturers, Quickfix, it is claimed, will produce permanent patches in concrete that can be used two days after installation, contrasting with the two to three week period heretofore needed for concrete patches to harden.

"One serious problem that the maintenance divisions of industrial plants constantly face," says the manufacturers, "and for which no solution has until now been found, is the efficient maintenance of concrete floors and driveways. The increasing volume of internal trucking done for the most part with steel-wheeled trucks and trailers, has resulted in more rapid dusting, crumbling, and disintegration of the floors and roadways over which the traffic moves. Operations are finally impeded by the poor condition of the route, and the necessary repairs are undertaken later, as a rule, than they should have been.

"After making the repairs it has been the practice to block off the affected areas until the patches are hard enough to resist wear. This is usually a period of from two to three weeks, varying with weather and temperature.

"A special study of this problem by The Master Builders Company, who are specialists in concrete floor construction, has enabled them to develop a material and a method of patching which shortens this repair period to the minimum. The material is 'Quickfix' and when properly applied only 48 hours is required to produce a surface sufficiently hard to bear moderate traffic and 60 hours fits it for normal use.

"The installation of 'Quickfix' patches can be made," the producers assert, "by any handy man, not necessarily skilled in the handling of concrete, by following directions furnished with the material. 'Quickfix' speeds the hydration of the cement. In 24 hours the strength of a 'Quickfix' patch is 71 per cent greater than that of ordinary cement mixtures: the permanent tensile and compressive strength of the patch is considerably greater than that of ordinary cement. In addition 'Quickfix' furnishes a binding property which not only bonds the coarser aggregates of the patch, but which bonds the patch firmly to the edges of the old surface. The resulting flint-like patch becomes practically an inherent part of the old floor.

"Patches can be laid Saturday noon and put into use Monday morning. The cost of using 'Quickfix' for floor repair is less than two cents a square foot.

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National Builder

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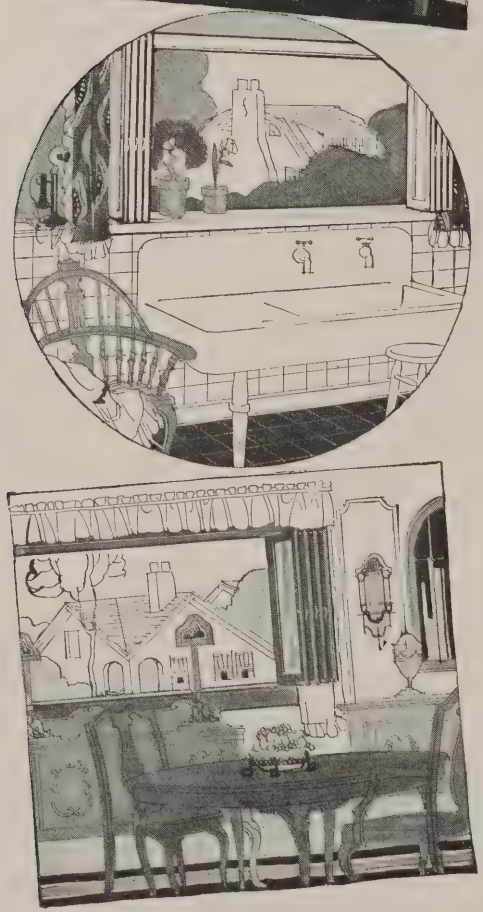

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National Builder

Good Things Coming in the September Number

IT may not be fair to stop you here, before you have seen a single page of the August NATIONAL BUILDER and begin to talk about September, but we are going to do it anyway. It is always well to be forehanded in everything you do, even to looking forward to what you are going to get in the future in your favorite building journal.

OF course you have seen the picture on this page and have immediately surmised that you will find an article in September about a bank. That is true. It is an unusual bank built on an unusual site, in a large Southern city, and you will be interested in seeing how the builder worked out some difficult problems in its design, plan and construction. Bank buildings are usually the most conspicuous and handsomest structures on the street, and a good bank job is a good advertisement for a contractor and builder.

An article about this bank will appear in the September issue of National Builder

THERE is one outstanding fact about the month of September that makes it a memorable month in the mind of everyone. School opens! Think what that means to every family in the country—millions of children, hundreds, maybe thousands of them in your town—off every morning to learn and play, and back every afternoon, five days a week. How different are their schooldays from yours! Yet a lot of these boys and girls are going to school in the same old buildings that housed their fathers and mothers, or in buildings too small to accommodate the attendance or too unsanitary, too outgrown for further use and new buildings must be constructed. In September, the school building problem will again come up in many districts and schoolboards everywhere will discuss new buildings. It is well, therefore, for the forehanded builder to be able to put his hands on plans for a good school building or two and be fortified with some information about schoolhouse construction and equipment so he can give the local schoolboard good counsel in the matter and by so doing earn for himself their favorable consideration when they get around to letting contracts. Accordingly, the September issue of NATIONAL BUILDER will have some helpful material on schools. Watch for it and keep the number for future reference.

DOWN East there is a man who has made a marked success in the building business. How he did it is an interesting story and contains a suggestion which any builder can put into practice with equal profit. You will be interested in an article about him in the September number and the idea contained in that one story may, if applied in your own business, make a difference between a mediocre and a big success for you. The best way to learn is from the other fellow. Profit from his experience.

THERE will be a lot of other good reading, too, in the September number, but it wouldn't be fair to you to tell you everything now, before you have even read this August issue. But watch for the September issue by all means.

NATIONAL BUILDER is a journal for the contractor, architect and builder. It is published on the first of each month by the Tradepress Publishing Corporation, 542 South Dearborn Street, Chicago, Ill., to whom all communications concerning subscriptions, contributions or advertising should be addressed.

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Renewals: Instructions for renewal, discontinuance or change of address should be given three weeks preceding date of issue. Both old and new addresses should be given. Subscribers wishing to discontinue their subscriptions must notify the publisher upon date of expiration.

Contributions to the editorial pages will be accepted solely on their merits and paid for at the regular space rates. Contributions of timely nature must be in on the 15th of the month preceding date of issue.

Advertising: Space in the advertising pages is sold according to published rates, furnished on application. Copy must be in on the 15th of the month preceding date of issue if proofs are to be submitted for approval before publication. Last forms close on the 23rd of the month preceding date of issue. The publishers reserve the right to reject or revise any advertisement containing statements of doubtful authenticity or derogatory to any building material, accessory or equipment.

Mechanical Requirements: Type size of page, 7x10 in.; half-page, 3½x10 in. or 7x4⅞ in.; quarter-page, 3½x4⅞ in. or 7x2⅜ in.; eighth-page, 3½x2⅜ in. Screen required, 120 line; reversed plates must be stippled or Ben Day.

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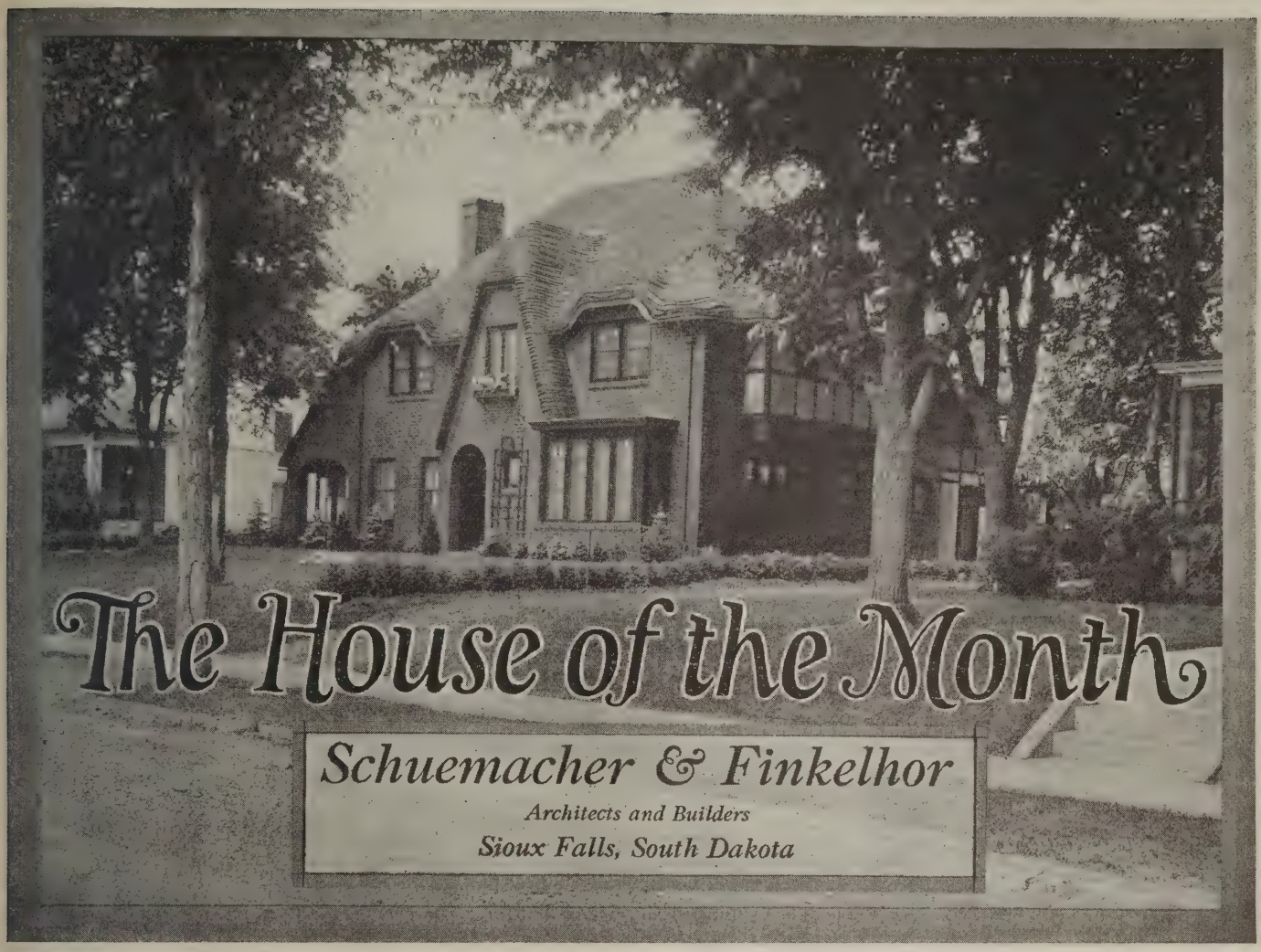
Detail of entrance to "The House of the Month," the home of John Morrell Foster, Sioux Falls, South Dakota. Schuemacher & Finkelhor, Architects and Builders

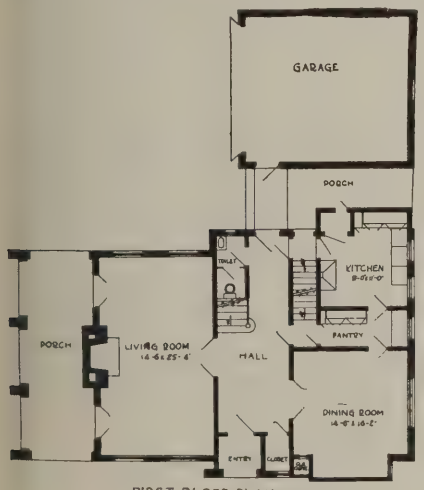


On this page you will find every month hereafter in NATIONAL BUILDER plans and illustrations for a house which will be called "The House of the Month," and which will be distinguished for its general attractiveness and the practical character of its plan.

To start this series a great many points of interest are to be observed in a house designed and built by Schuemacher & Finkelhor, architects and builders, in Sioux Falls, South Dakota, for John Morrell Foster. The design of this house and the modern layout of its rooms are one more indication that beautiful homes are not a possession of only one section of the country but that they are to be found everywhere.

In Mr. Foster's home there is much of the feeling common to the English type of architecture. The designers have simulated the old thatched roof effect by means of wooden shingles laid in irregular courses and rounded at the eaves. A little half-timber work in the overhanging portion of the second floor carries out the effect. Brick is the principal material used in the construction and it is laid with wide, scraped mortar joints.

The plan, on both floors, is most interesting. The close connecton with the garage in the rear is an arrangement that is coming more and more into use,



FIRST FLOOR PLAN

Rear view of house showing drive entrance to garage

SECOND FLOOR PLAN

View from the golf course of the clubhouse of the Clinton Golf and Country Club, Clinton, Iowa. Howard L. Wheeler and William Crain, Contractors

A Well Planned Club House for a Small Country Club

By E. J. Welsh

IN the past few years golf has become a national pastime and today is probably ahead of baseball in popularity. Where a few years ago only the larger cities could boast of country clubs, there are now golf courses and beautiful clubhouses in hundreds of smaller cities and towns, and many of these are as elegant as those of the larger centers. Country clubhouse construction opens up a new and very interesting field for the contractor and builder and presents the architect with an opportunity for ingenuity in planning and designing.

The clubhouse of the Clinton Golf and Country Club, of Clinton, Iowa, described here, has many points of interest. In its beautiful natural setting, surrounded by hills, it has an air of blissful solitude and rest—a secluded haven away from the humdrum of paved streets and crowded walks. The lay of the land is well suited for a golf course and the clubhouse and its surroundings, viewed from a distance, make an attractive sight.

Golf is the national sport of this country. Every follower is a participant and his strongest competitor is himself. That is why there are over 2200 golf courses in the United States and the number is increasing at the rate of between 400 and 500 annually. These courses cover a total area of over 220,000 acres, and they, with their clubhouses, represent an investment of well over $100,000,000. Not a city in the United States exists that does not now have or is contemplating a private or municipal golf course. Realtors report an increase of from 10 to 100 per cent in the value of lands nearby or adjacent to golf courses, and the construction of a course invariably stimulates building activity in its vicinity. It is in recognition of these facts that National Builder publishes in this issue an article about a country club house that will interest a majority of its readers.—The Editor.

Howard L. Wheeler, of Dixon, Illinois, was the contractor on the job and he was assisted by William Crain, who is in the general contracting business in Clinton, Iowa. Work was started in the spring of 1922 and the clubhouse was entirely completed and ready for occupancy by early fall. The plans were so treated that another wing may be added to the building at any time without detracting from the symmetry, beauty and unity of the building as a whole.

The grounds are located within the city limits, but far enough away from the main part of the city to insure privacy and seclusion. They may be reached by motor and street car, so that members have no difficulty in going to the club at any time. There is a nine-hole course which takes from forty-five minutes to one hour for an average player to cover. Seventy-five players can be on the course at one time without interfering with each other. The club has

The promenade porch or terrace, laid with 9x9-inch red tile with ⅝-inch black joints. The walls are constructed of 4x4 studding, wind-braced, lathed on exterior with Bishopric board with exterior plaster of Kellastone

The sun porch overlooks almost the entire golf course. It is constructed with timber with 12-inch concrete coping. The ceiling is stippled Kellastone; the floor is red tile, and the furniture is wicker

View of interior showing lounge and dining rooms thrown together by opening accordion doors that separate them. A ballroom 123 by 31 feet is thus produced. The walls and ceiling of the lounge are white, the curtains blue and gold, the rug is a dark mixture, hand stenciled; the table and some of the chairs mahogany. Bright colors are introduced by the coverings of the overstuffed pieces. The ceiling is 18 feet high and the ceiling trusses are 8x12 yellow pine timbers. The floor is maple. The fireplace has a 20-foot breast

around two hundred and sixty members, of which about forty are women. As the membership grows, another nine holes directly across the road from the clubhouse may be opened, as the club owns the land. A professional player in the employ of the club is in charge of the course and gives lessons to the members.

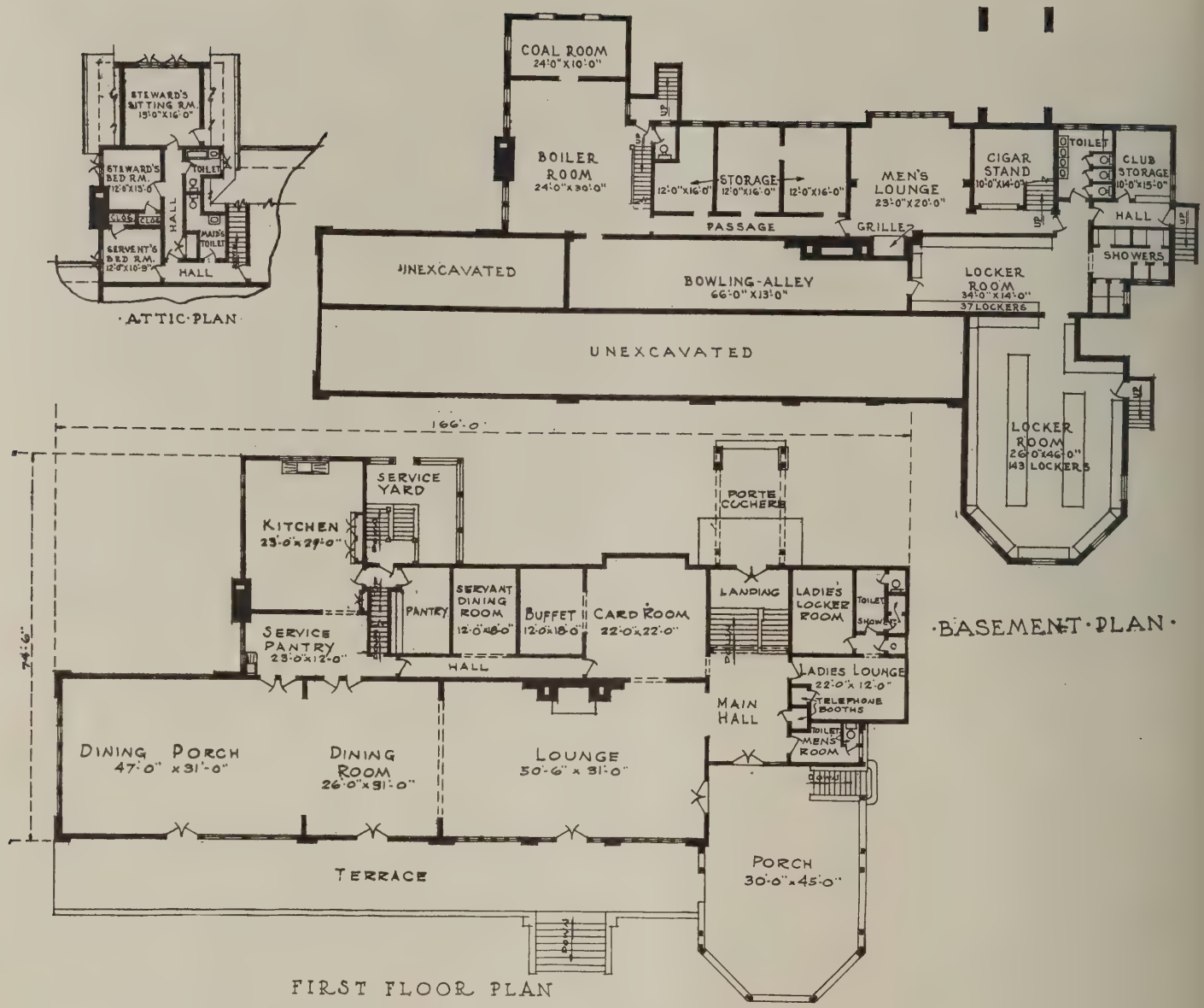
The total cost of the building, exclusive of furnishings, was close to $27,000 and it was financed by a bond issue, which was easily sold among the local townspeople and banks. Shares of $100 each were sold to the members in various lots, so that each member is a stockholder in the club; some, however, invested more heavily than others. The rooms were furnished by various members, who, eager to make the club a wholehearted success, gave liberally of both their time in planning it, and their money in financing it.

Three Floors

The overall dimensions of the clubhouse are 166 by 104 feet. There are three floors. On the first floor is the professional's room, where the golf sticks and equipment are kept, the men's locker rooms, toilet and shower baths, the concession stand, and the men's grill. Space is provided on this floor for two bowling alleys and for pool and billiard tables. Though this equipment is not yet in, the space is left for it. On the second or main floor is the front hall, the main lounge, the dining room, sun porch, ladies' lounge, toilet and showers, the card room, with buffet, kitchen, butler's pantry, serving

Where devotees of cards gather. Note the buffet room in the background. Walls are buff-blue, doors and trim dark blue. The light shades are dark green. The floor is black and the rug dark green, with tint of orange, hand stenciled

The ladies' lounging room. The walls are painted bird's-eye maple to harmonize with the furniture. The curtains are rose and blue and the rug blue velvet. The chairs and chaise-longue have rose and blue cushions and covers



Floor plans of clubhouse of Clinton Golf and Country Club, Clinton, Iowa. Howard L. Wheeler and William Crain, Contractors

pantry, provision closet, and servants' dining room. On the third floor are the living rooms of the resident manager and his wife.

The basement walls and foundation are of concrete throughout, making practically all of the first floor rooms fireproof. The walls of the second floor are constructed of 4x4 studding wind-braced, lathed on exterior with Bishopric board with exterior plaster of Kellastone heavily stippled to cast a shadow. The picture of the promenade porch shows the attractive effect obtained from this sort of exterior treatment. The roof is frame and is heavily trussed and covered with red Creo-Dipt shingles, carrying out an all-together pleasing color scheme. The floors of the promenade porch and of the sun porch are laid with 9x9 red tile with 5/8-inch black joints. The windows are all casement sash and open out, with the screens on the inside.

The men's locker room in the basement is 26 by 46 feet. There are 143 lockers, each large enough to accommodate two or three members. There is a special guest locker room which contains 37 lockers, making a total of 180. These are painted a dull green and each one bears the card of the member or members to whom it belongs. Adjoining this room are the showers, six in number. There are partitions between each one. These are metal lath covered with Keene's cement and finished with four coats of enamel, so as to withstand steam and water. The men's locker rooms and showers are isolated from the ladies' room, the latter being on the second or main floor.

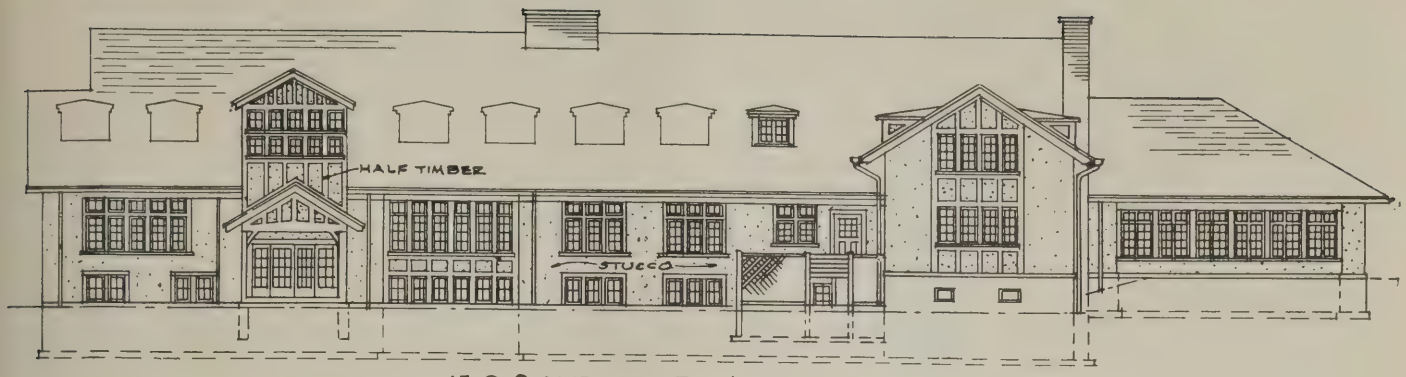
Adjoining the men's locker rooms in the basement is a men's lounging room or grill. It is 20 by 23 feet in size. Buffet lunches are served here and there is a huge Dutch fireplace where steaks may be broiled and game roasted. The walls are painted white, the woodwork dark red, and the furniture is red and green wicker. A checkered mat rug on the floor completes the furnishings of the room.

The professional's room is 10 by 15 feet in size. It is entered from without on the side of the building. There is ample storage space on this floor, besides the unfinished part, which is available for bowling alleys and athletic equipment.

The Main Floor

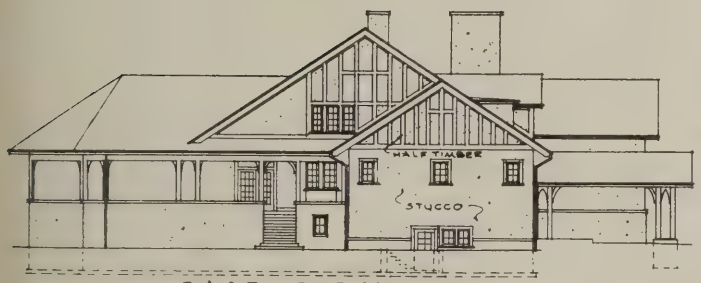
The first floor is, of course, the main floor, where all of the principal rooms are located. The large sun porch is straight ahead off the main hall from the carriage entrance. There are two entrances to it from the outside. The porch is octagonal in shape, so sun and breezes from every direction are admitted. It is constructed of oak timbers with a 12-inch concrete coping, finished with a light gray cement, with ceiling of Kellastone with lighter stippling than the walls. The floor is laid with red tile and the furnishings are all wicker. This porch commands a view of almost the entire golf course and is always cool, if there is a breeze stirring at all.

The main hall, from which the other



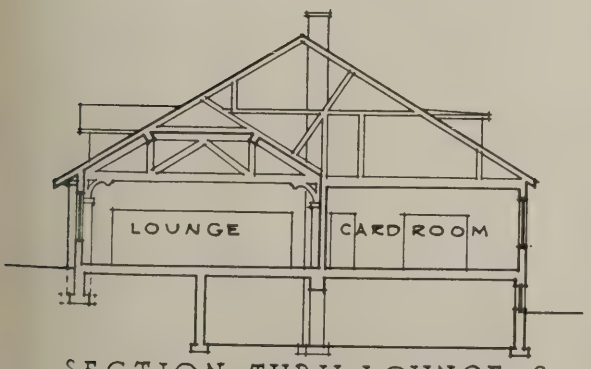
NORTH ELEVATION

SOUTH ELEVATION

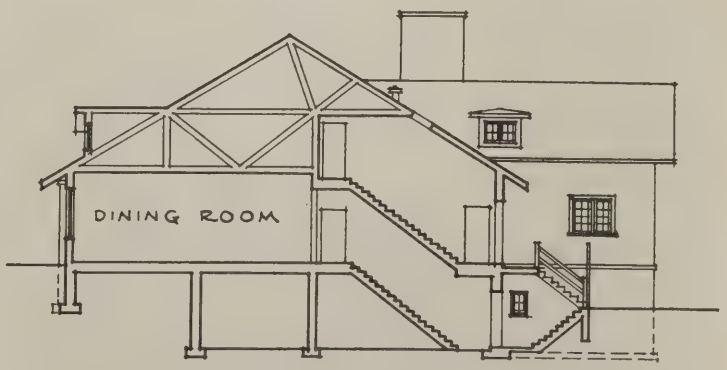


EAST ELEVATION

WEST ELEVATION



SECTION THRU LOUNGE & CARD ROOM



SECTION THRU DINING ROOM

Elevations and sections of clubhouse of Clinton Golf and Country Club, Clinton, Iowa. Howard L. Wheeler and William Crain, Contractors

rooms open, is 20 feet 6 inches by 15 feet 6 inches. The rug on this floor is hand stenciled. It is dark with a mixture of black, green and orange. It is easily cleaned and very durable.

The ceiling of the main lounging room is 18 feet high and there are four wood trusses of 8x12 yellow pine timbers. The floor is maple. The fireplace, as shown in the picture, is unusually large, having a 20-foot breast. Some idea of the size of the two flues, there being one here and one in the kitchen, may be gained from the fact that they contain over 35,000 bricks—more than enough to build a house.

The men's locker rooms contain a total of 180 steel lockers. They are painted a dull green

The lounge, 31 feet by 50 feet 6 inches, is tastefully furnished. The curtains are blue and gold, and the rug, like the one in the main hall, is hand stenciled. This stenciling is done twice a year by experts. The davenports and chairs are of the overstuffed kind, protected with coverings of bright colors. There are numerous lamps, a large reading table and a piano. The walls and trim are white. The windows all face the golf course and open onto the promenade porch.

Accordion doors separate the lounge from the dining room, which is 31 by 26 feet. These doors are easy to operate and can be closed or opened in a moment's time. Thus the dining room can be shut off from the lounge when desired for private parties. Adjoining the dining room is the dining porch, 31 by 47 feet in size. This room may also be shut off by means of accordion doors. These three rooms when thrown together make one large ball room, 123 by 31 feet, without a single pillar to obstruct the way. These three rooms are floored with maple, making an excellent dance floor.

The ladies' lounge and rest room is, in the language of the ladies, "a perfect dream." It is 12 by 22 feet in size. The curtains are rose and blue; the furniture bird's-eye maple; the walls are painted bird's-eye maple; and the rug is blue velvet. The chairs and couch are rose and blue. The ladies' lockers, showers and toilet are off this room. There are 24 lockers.

Another interesting room is the card room, 22 by 22 feet in size. The walls are buff hue, the doors and windows dark blue, the card tables and chairs are pearl gray, the curtains are a mixture of red and white, and the shades and the electric lights are green, making the light restful on the eyes. A green hand stenciled rug covers the floor. This room is popular with followers of card games. A buffet room 12 by 18 feet is adjoining.

The kitchen is efficiently arranged and equipped. It is 23 by 29 feet. It contains two large ranges, a huge refrigerator, and a number of Curtis standard design built-in cupboards, finished in white enamel. The walls, too, are white. A large serving pantry adjoins the kitchen, and is between the kitchen and dining room, making serving rapid and efficient. This pantry is 23 by 12 feet. There is a smaller pantry to one side, 19 by 14 feet in size. The picture of the pantry shows its cupboard equipment. The cupboards are built-in around three walls and furnish ample space for the numerous dishes and kitchen utensils required in the serving of dinners to large parties.

Third Floor

The rooms on the third floor, where the resident manager and his wife live, are as comfortable and convenient as any individual house. There are three rooms and bath. Additional rooms can be added here at any time, as there is space available. These quarters are reached directly from the kitchen.

As far as possible the clubhouse was constructed of materials of stock sizes, which helped considerably to keep down the cost. The clubhouse is used the year around—for golf in summer and dances and parties in winter. There is a hot-water heating system so that the rooms are kept warm and comfortable on the coldest day in winter.

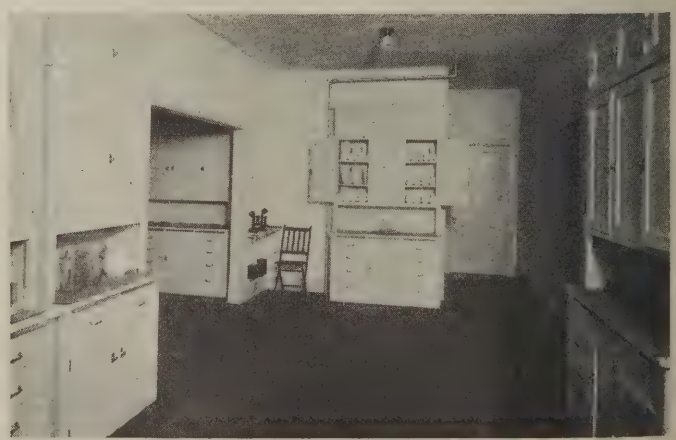
The Clinton Golf and Country Club are proud of their new clubhouse and well may they be, for they have a most attractive and beautiful building and grounds that are ideal in every respect. But what this club has accomplished in building their golf course and clubhouse is something that can be done in any wide-awake town or small city, and possibly the pictures and plans accompanying this article will be of interest to every contractor and architect, not only from the construction standpoint, but from a personal standpoint as well, for that day when his own town may contemplate a country club, if it hasn't one already.

Zoning Restrictions in Dallas Lifted

"THE fight of the city against the erection of mercantile buildings in residential sections has ceased," Mayor Louis Blaylock, of Dallas, Texas, recently announced.

"From the interpretation which the courts have handed down, it seems that we have no right to zone the city. However, if the property owners in given areas enter clauses in their deeds whereby erection of mercantile buildings is prohibited, I can see no likelihood of business buildings going up in such areas."

The kitchen, showing ranges and refrigerators



The service pantry showing cupboard equipment

Store Front Construction

III.—Shoring

By Roy M. Singer
Construction Editor, National Builder

IN remodeling a store front the general procedure is to take out all intermediate columns from the display frontage and to span the width of the store with a single beam or with a series of long beams so that there may be no unsightly columns to mar the show windows. Inasmuch as these intermediate columns are necessary to support the upper floors, some means of holding the upper floors is necessary while these columns are removed and the long beams set in place. This support is best furnished by what is commonly called shoring.

Shoring in this case is nothing more or less than a series of heavy wooden columns which serve temporarily to hold up the top stories of a building so that the support for the lower stories may be taken out and a new method of support installed. The photograph on this page shows a building where support for the upper stories was furnished by a system of shoring while alterations and changes in the structure were in progress.

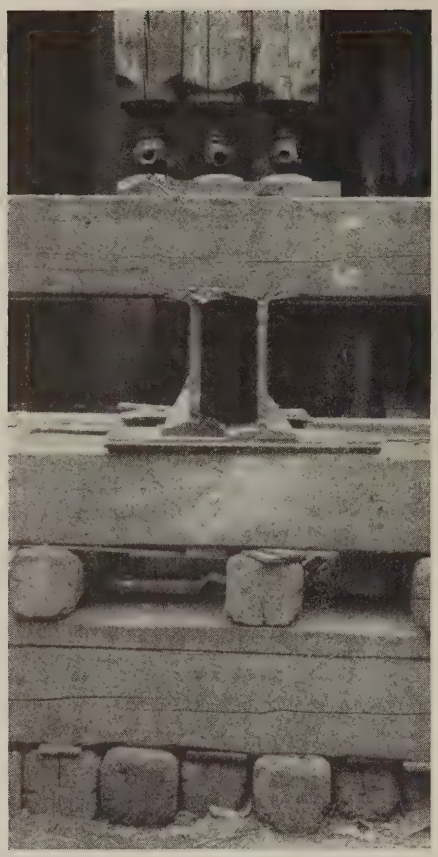
The support below grade consists of a system of cribbing which rests on the ground or on the basement floor. The cribbing is made up of short pieces of 6x6 and long timbers, generally 8x8, with a 10x10, or 12x12 at the top and bottom of the cribbing as shown in the accompanying sketch. Resting on the cribbing are a number of steel beams which run through the wall. A heavy timber girder is then placed across these steel beams and on it rest the vertical timber supports or "shores." The same beam and girder arrangement is used at the top of the shores, or vertical timbers, in a reversed position. By referring to the sketch it will be seen that the entire wall below the upper beams may be removed since that portion of the building above the beams is supported from the ground or the basement floor by the shoring.

In order to fit the shores and bring a load upon them, steel jacks, as shown in the sketch, are placed at the lower end of the shore. These jacks are generally made of cast steel, and in order that they may have a good lifting power the screw thread is made square and with only a slight pitch. At one end of the screw is a ball which has a rounded projection directly opposite the screw. This rounded projection fits into a hollow in a plate and thus forms a bearing when the screw is turned. A collar cut to turn on the thread is used to support the end of the shore and the shore is bored out to permit the entrance of the screw.

To bring pressure on the shore, the thread is turned so that the collar is forced upward. As the shore rests on the collar, it, too, is forced upward until it takes its required load. Where jacks are not available, wedges are sometimes used to bring bearing on the shores.

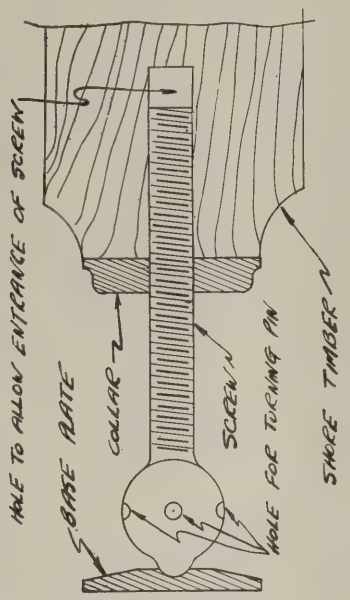
Where jacks are used it is important that the lower plate have a solid setting and that the shore fit squarely on the collar. If this point is neglected the load may not be evenly distributed over the various members which are to carry it and the tipping

View of a remodeling job showing upper stories supported by shoring



Close-up view of correct method of setting jacks

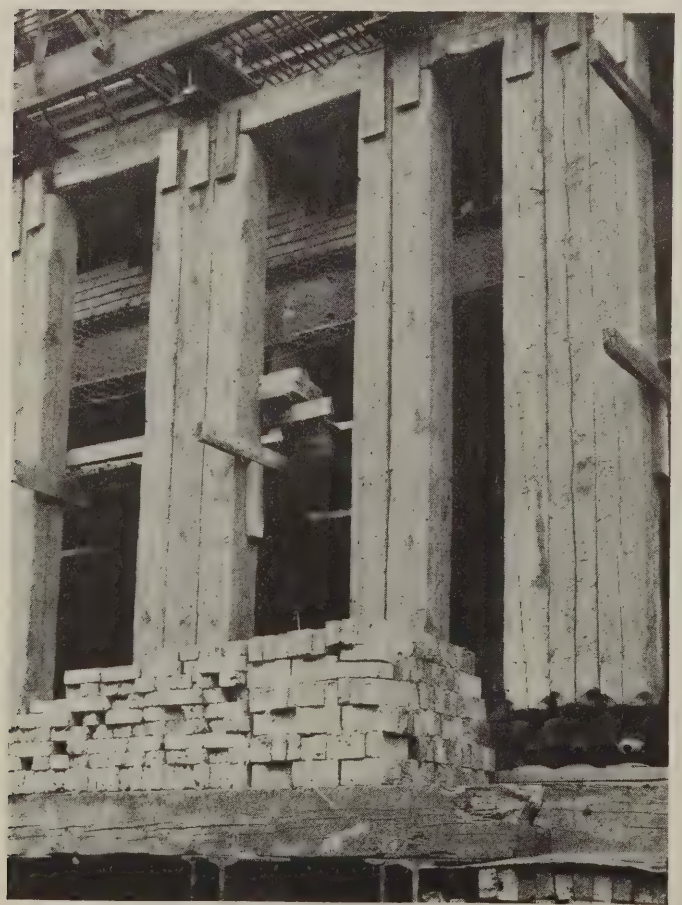
of a shore and the consequent collapse of the entire structure may result. Notice in the close-up view of the correct method of setting jacks, and in the accompanying



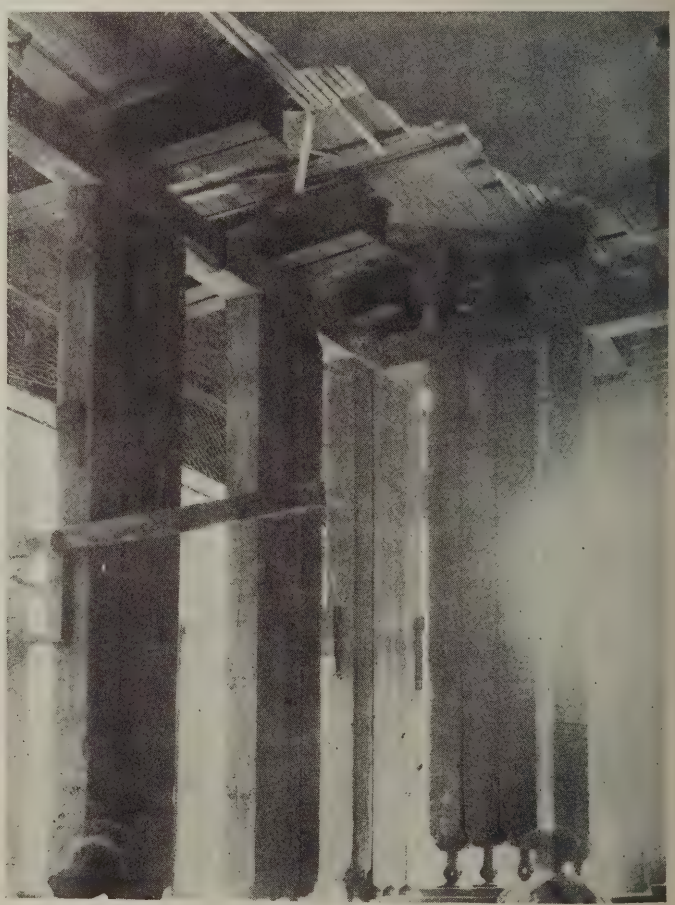
Detail of shoring jack

sketch of a shoring system, that the bottom plates of the jacks rest on a short piece of two-inch lumber. This is so that a better distribution of the load may be had. In-

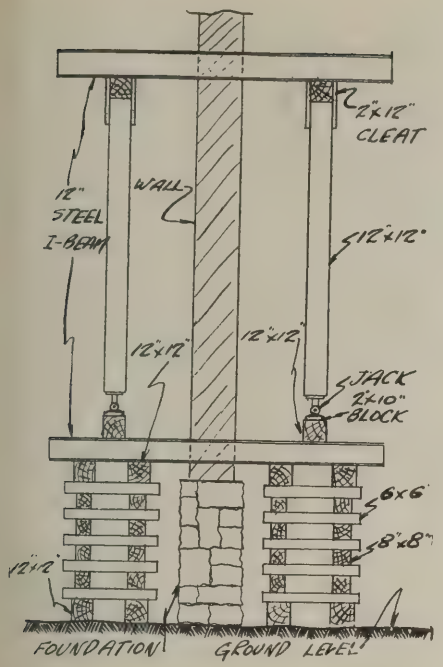
Looking inside of a line of shoring. Note details of arrangement



View showing outside of building supported by shoring. Note cleats to hold girder to shores



View showing inside of building supported by shoring. Note method of shoring at corner



Sketch of shoring support

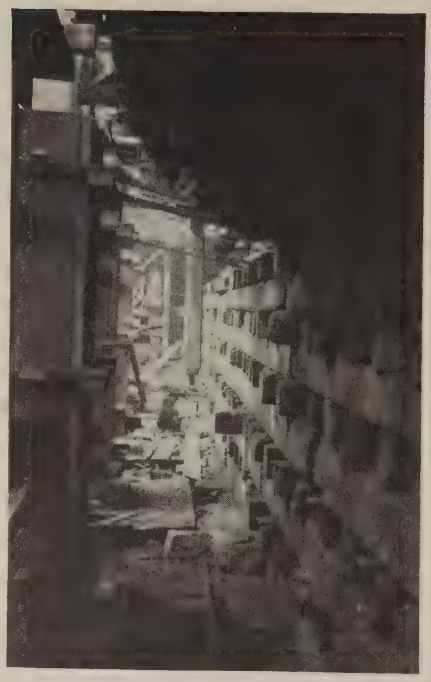
stead of transferring the load from the jack-plates directly to the girder, the load is delivered first to the short piece of lumber and distributed over a greater area of the girder than if it were transferred direct. Another reason for using this short piece of lumber is that injury to the girder by having the jack-plates pressed into it is avoided.

In the view showing the outside support for a building notice that at the top cleats are nailed to the shore and the girder which supports the beams. These cleats form a safeguard against the overturning of a shore and they should never be omitted. Although they may be nailed to both sides of the shore as an added precaution against tipping or sliding, they are generally only nailed to the outside.

In forming support for a building, shores may be set singly and close together or, to provide working space, they may be set farther apart but grouped in twos and threes as shown in the illustration.

It must always be borne in mind that the efficiency of a shoring system depends upon each unit of the system assuming the load assigned to it. In order to make this possible care must be taken to make the system tight and to assure a firm bearing for every unit used lest some take more than their allotted load, and others less.

The pictures used in this article were taken on an alteration job being done in Chicago, Illinois, by the Acme Construction Company. Joseph P. Kwiatkosi of Chicago was the sub-contractor for the shoring.



Method of below grade support for shoring system

Children Build Their Own City of 500

By Jane Hill

BUILDERS and manufacturers in this country are lamenting the shortage of labor and blaming the immigration laws for the lack of skilled workmen to supply their needs. Meanwhile little effort is being made to train the youth of the country to supply the lack of skilled artisans.

On the Island of Syros, off the coast of Greece, a most interesting economic experiment is being tried out by American capital to have children "learn while they earn."

This island has been alotted by the Greek government to the Near East Relief, the organization chartered by Congress to care for the people of the war-torn areas of the Levant. When a large part of Syros was given over to little war waifs, who were brought from the interior of Turkey because of the order of the Angora government evicting all Christians, it became necessary for these children to play a big part in the building of their future homes.

With the crudest of implements and the most primitive methods, the orphan wards of America are working with might and main to erect six dormitories to house 5000 boys and girls. The children are brought over to the island a few hundred at a time as the work progresses. Seven hundred and fifty refugees are also engaged on the building operation, their only means of support being provided by the money they receive from the Near East Relief for their services.

The juvenile colony at Syros will have to have a bakery capable of baking 8400 pound loaves of bread a day. The children will also operate a laundry. Another important building will be a huge public bath, it being the custom of the country to have a centralized public bath house rather than bath rooms in the homes. A school with work shops will be one of the most important buildings, because in all Near East Relief institutions industrial training is stressed in the children's education. They have to know how to support themselves at an early age.

Boy masons building wall of Near East Relief Orphanage at Syros, which they are to occupy

Ten quarries are in operation to supply the marble used for the buildings. All the stone is carried on the backs of the men and boys. Most of the laborers are wearing garments that bear little relation to present-day clothes, and the implements they employ have no resemblance to modern American hardware.

As rapidly as money is provided modern American equipment is being sent to Syros, and it is expected that the introduction of modern building methods by relief workers will eventually open up the Near East as a market for American builders' supplies.

In this connection it is interesting to note that the Greeks in the United States have financed the building of four model refugee villages near Athens to house 10,000 refugees. The cottages built as emergency shelters are a permanent contribution to model tenements of which any city might be proud, and the cost is exceedingly low. One-room cottages, 16 feet square, suitable for a family of five people are being constructed for $50 each. Every cottage has ample air and sunlight. In the rear is a little garden. The refugees can start life anew here in comfortable, healthful surroundings and feel hope is not dead for them. It is true, that this isn't the American idea of comfort; but it is 100 per cent better for these poor homeless people than being huddled together in refugee camps with the ground for a bed and old burlap and grass to keep the rain off.

A Typical Four-Family Apartment Building in Lexington, Ky.

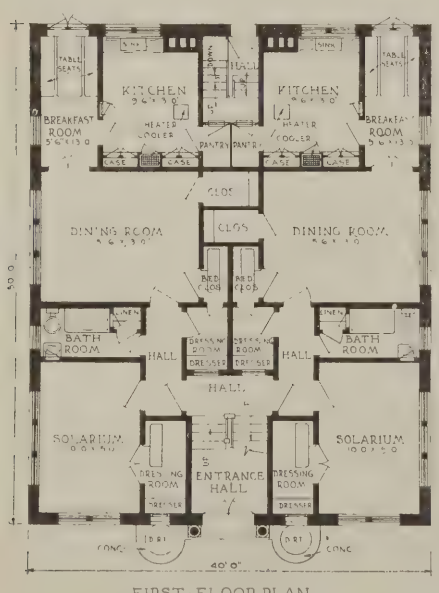
John V. Moore & Company, Architects

Congleton Lumber Company, Builders

HERE is a typical four-family apartment house such as is to be found in Lexington, Kentucky. Its plan and ventilating and heating equipment are of particular interest.

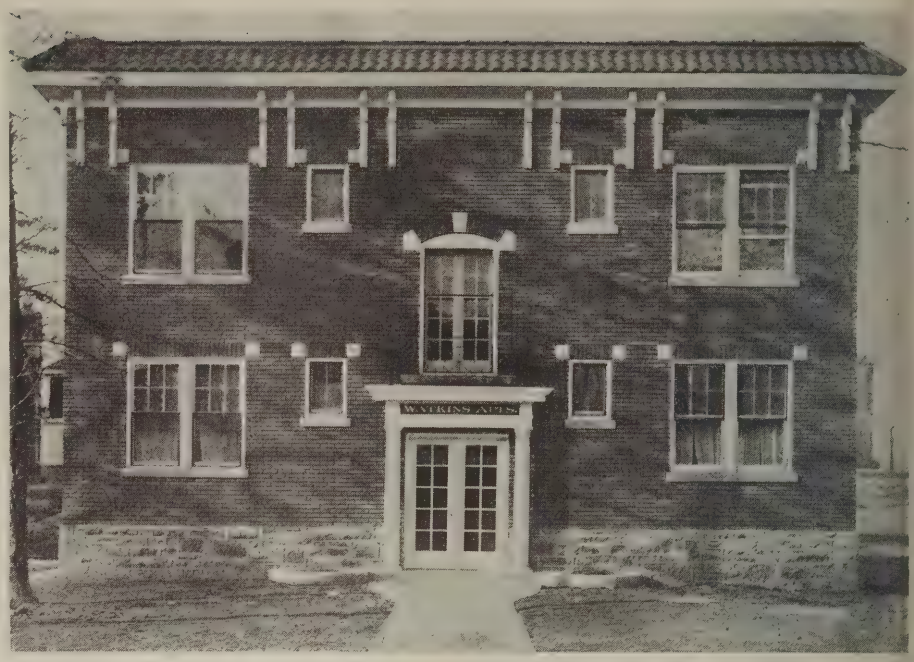
The building cost in the vicinity of $25,000 and each of the four apartments rents for about $75 a month. Being of only two stories, there are no long flights of stairs for any of the tenants to climb, which, together with the comparatively low rental, makes the house very attractive to prospective renters. The main elevation has certain pleasing features and the number and location of the windows insure pleasant rooms within. Notice in the photographic illustration of the building that air circulation between the roof joists and ceiling joists is provided by means of cast-iron screen vents in the side of the building and two ten-inch Allen air turbine ventilators in the roof. Access to the roof is through a pent-house which contains expansion tanks for the heating system.

The plan shows a minimum of hall space. The room has been thrown into the apartments themselves instead. There is an inviting entrance hall, of course, but no unused space. The interior arrangement of the apartments is interesting. There is a solarium or living room, with a large bed closet and dressing room adjacent which make it convertible into a bedroom at night. Some tenants will probably prefer to use the dining room as a living room, inasmuch as there is a dining alcove or breakfast nook, and call the solarium their bedroom. Notice that the dining room also has a closet bed and so provides a second bedroom in emergencies. A little dressing room, with window admitting light from the main hall, is directly opposite the bathroom. The door to the bathroom is glazed with Florentine glass, which helps to make a bright interior hall. The bathroom has the usual fixtures, including a built-in medicine cabinet over the washstand, and in addition a linen closet, which is enclosed behind a door of its own and lighted by a window in the bathroom partition. This arrangement is not a common one and it has its advantages, as any housewife will understand.



FIRST FLOOR PLAN

Typical floor plan. Note the dressing rooms and closet beds

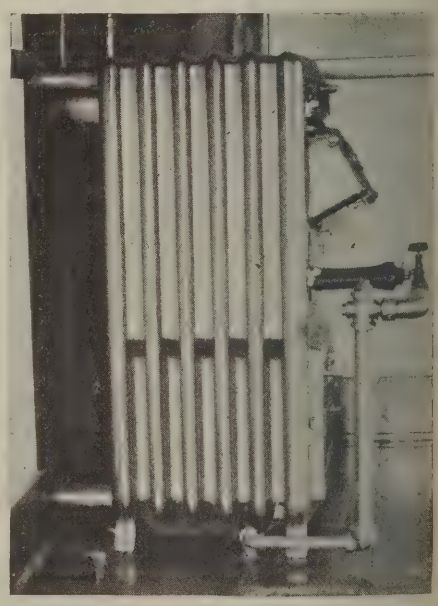


Note the screen vents just beneath the cornice. With Allen air turbine ventilators in the roof, they help to keep the house cool in hot weather

As in the front of the house, there is no waste hall space in the rear. The service halls are within the main building and the kitchens are closed off from them by means of special doors with parcel receivers built-in. The ice man does not have to cross the kitchen floor, for the cooler is near the pantry door and situated on the inside wall where it is protected from the beating sun. The sink is beneath a double window where it gets abundant light and air. A built-in ironing board is a part of the permanent equipment of each kitchen and one that helps to rent the apartment. The breakfast room gets cross ventilation from windows on two adjacent sides and its privacy is insured by French doors shutting it off from the dining room. Base plugs are installed in the solarium, dining room and kitchen for the tenant's convenience in the use of electrical devices and movable lamps.

The method of heating is somewhat unique and is seldom met with in the northern part of the country. The Kentucky climate demands a heating system that is flexible of control and to meet such a requirement separate Arcola heaters, connected to hot water radiators and utilizing gas for fuel, have been installed in each apartment. This method not only provides an independent, easily controlled and cleanly heating unit for each apartment but also does away with the necessity for hiring a janitor to take care of a central heating plant.

The space usually occupied by a central heating plant is used to increase the size of the basement locker rooms.



"Arcola" heaters connected with hot water radiators and utilizing gas for fuel

A Group of Three Houses

Planned and Designed Especially for NATIONAL BUILDER *by The Architects' Small House Service Bureau of The United States, Inc.*

U.S.A. ARCHITECTS' SMALL HOUSE SERVICE BUREAU INC.

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Mr. Miles has "caught the ball," so to speak, so far as the purpose of these plans is concerned. They are published as a sales help for the contractor, architect, and builder as well as for their value to him for the information they contain regarding good design and construction and the proper use of materials. These attractive perspectives and complete plans should clinch many a sale for the builder whose customer is in the building mood. Use them for that purpose—show them to your prospects.

SOMETIMES, for various reasons, subscribers for *National Builder* want to purchase more than one set of the blue print plans for the same house. The Architects' Small House Service Bureau authorizes *National Builder* to quote sets of blue prints after the original service has been purchased, at $3.00 each. Specifications are $2.50 a set, and extra quantity surveys are $3.00 a set. These prices, the Bureau explains, are but a trifle more than the cost of production of the documents.

Orders and checks covering these plans and other instruments of service should be made out and sent to *National Builder* for certifying the sender as a paid subscriber for this journal and therefore entitled to the special prices allowed subscribers only.

Below is an explanation of the material and wiring symbols and miscellaneous data pertaining to plans on the following pages

MATERIALS		ELECTRIC WIRING SYMBOLS			
CONCRETE		CEILING OUTLET		3 WAY SWITCH	
BRICK		DROP CORD		GAS OUTLET	
WOOD		BRACKET		PUSH BUTTON	
PLASTER		BASE PLUG		BELL OUTLET	
TILE		SWITCH		BUZZER	

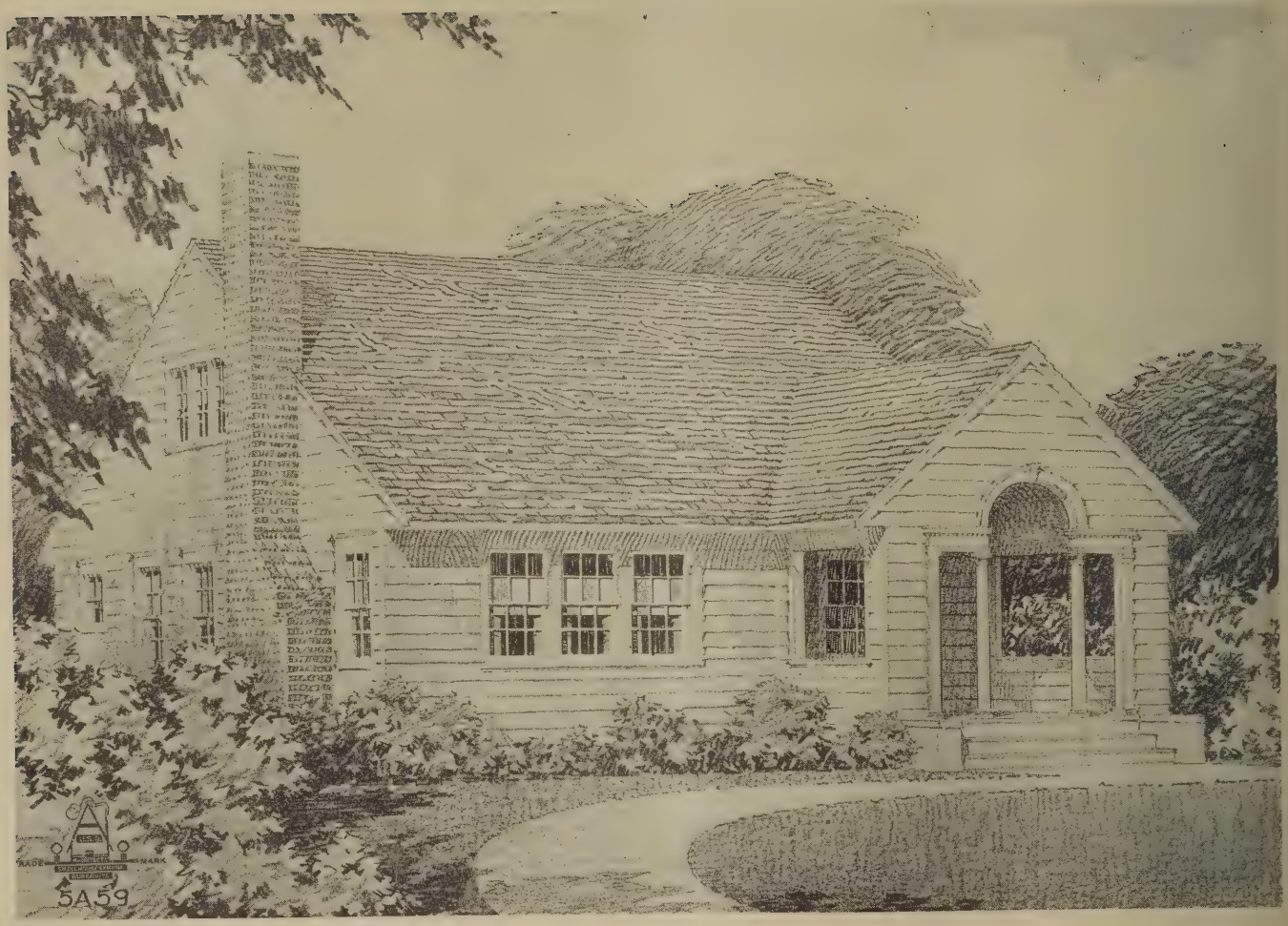
Dimensions are taken to outside of foundation walls, to outside of studs on exterior walls and center of studs for partitions.

Foundation walls shown concrete may be stone, brick, concrete block, or load-bearing hollow tile.

Where building ordinances permit, foundation walls may be 9 in. thick (with 20x9-in. footings), except in case of stone, which shall be 18 in. thick.

Stock numbers refer to moldings in Universal Millwork Design Book No. 20. In case these moldings cannot be procured, others of similar design and size may be substituted.

Provide 1 ⅛-in. screen and storm sash for all exterior openings, except ice door, unless otherwise noted. Bottom rail of storm sash to have vent.



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Two Extra Upstairs Bedrooms If Desired

House No. 5A59, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.

A FIVE-ROOM bungalow, Colonial in style, is shown here. It is of frame construction with exterior finish of shingles, concrete foundations, and cement base course. The triple-arch Palladian motif entrance to the porch is unusual.

There are two airy, light corner bedrooms on the first floor, and sufficient space under the roof to finish two extra upstairs bedrooms if desired. Dormers can be added to the front to provide cross-ventilation for these bedrooms or to light the storage space.

The working drawings include the plan for this second floor finished. Each bedroom has a good closet and there is a large storage closet opening onto the hall. This could be cedar lined and made into an excellent storage space for blankets and winter clothes.

The plan is simlar to that of the brick bungalow 5A55, shown in the April issue of the NATIONAL BUILDER, but with the living room, dining room and kitchen wider. It will go on a forty foot lot in most cities. The house can be decreased in width if desired.

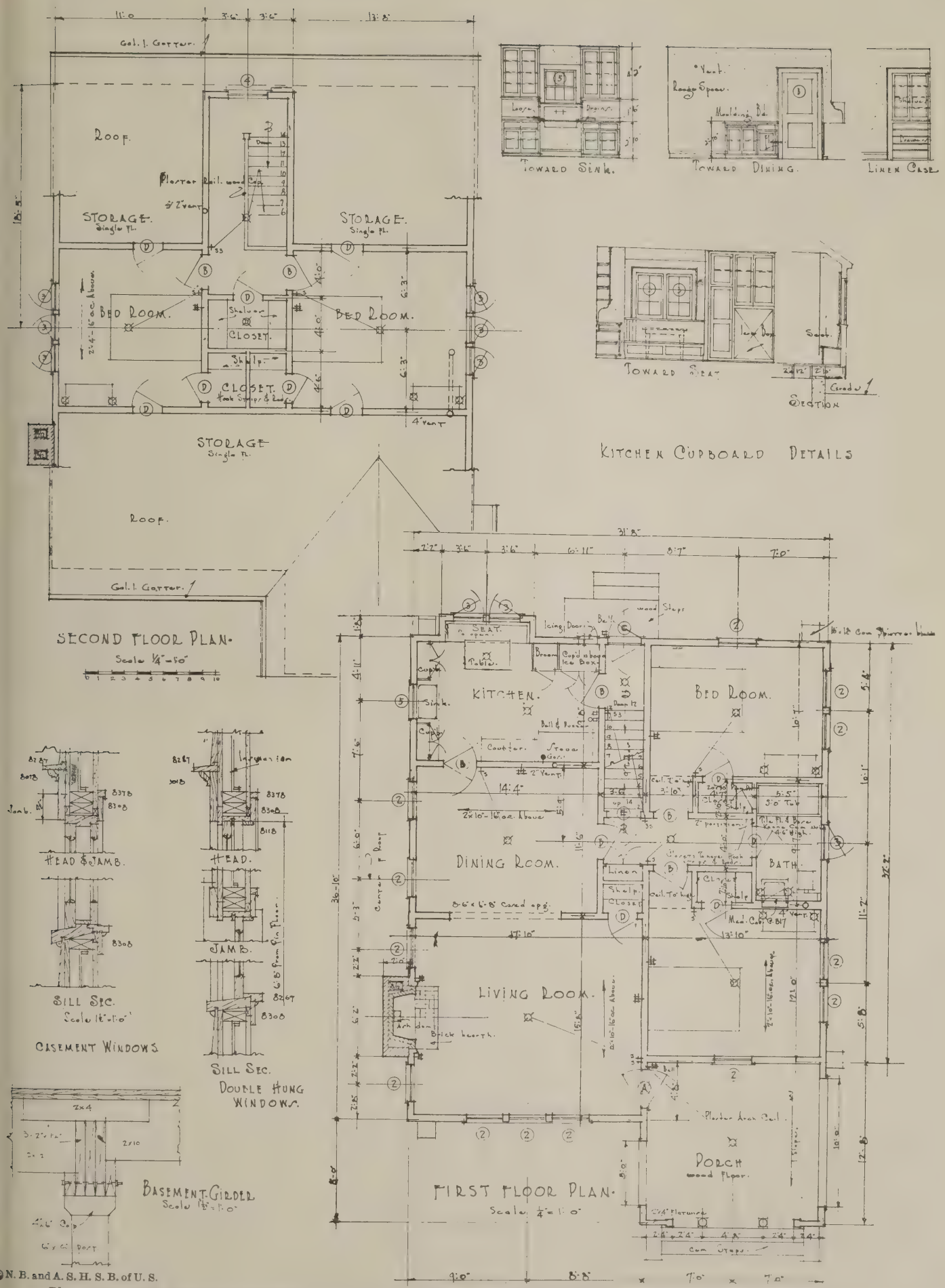
In spite of the popularity of the sun room there are many people who still want the open porch. Here is a porch that may be easily enclosed if desired. It has a vaulted plaster ceiling.

The arched opening between living room and dining room adds to the beauty of both rooms, yet it can be had at small expense.

There is a seat in the kitchen bay window for a breakfast nook of the pull-up table type. The number of closets is surprising, yet there is no waste of essential space. Through this plan every bit of space is used to most advantage, and the arrangement of rooms is most practical, and such as will appeal to the greatest number of bungalow builders.

As designed, this house should face south or east. The plans should be reversed for other facings.

The regular price of this design is $25.00. (To NATIONAL BUILDER subscribers $13.00.)



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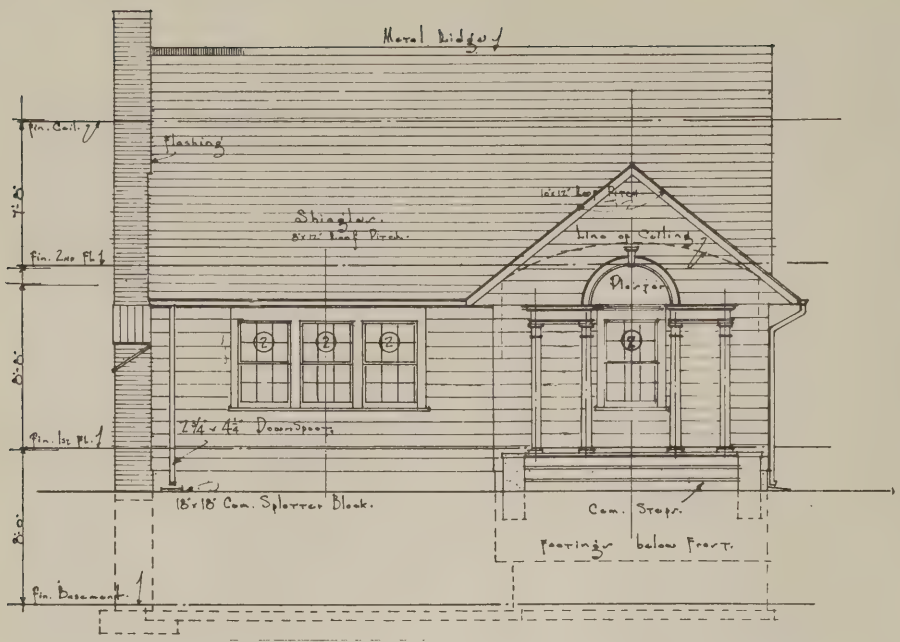
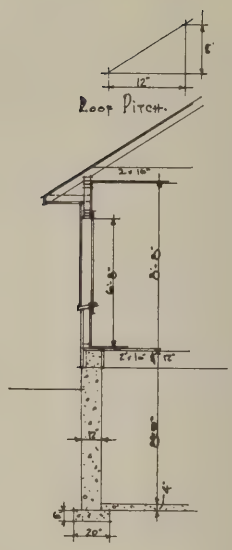
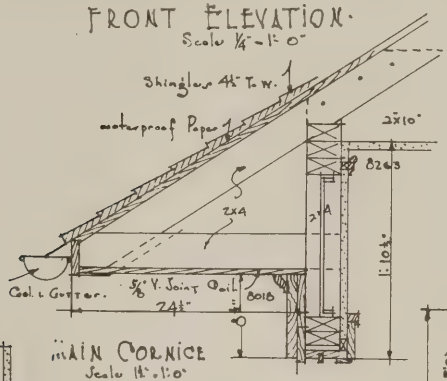
Floor plans and construction details for House No. 5A59, especially designed for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.



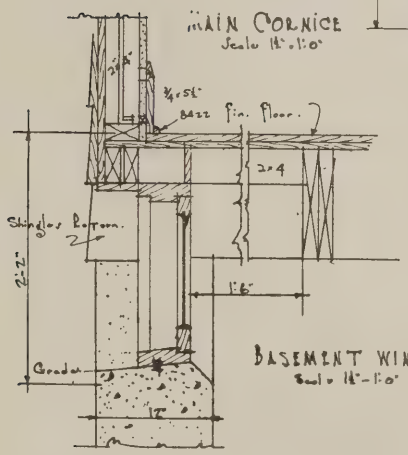


SECTION
Scale ¼" = 1'-0"

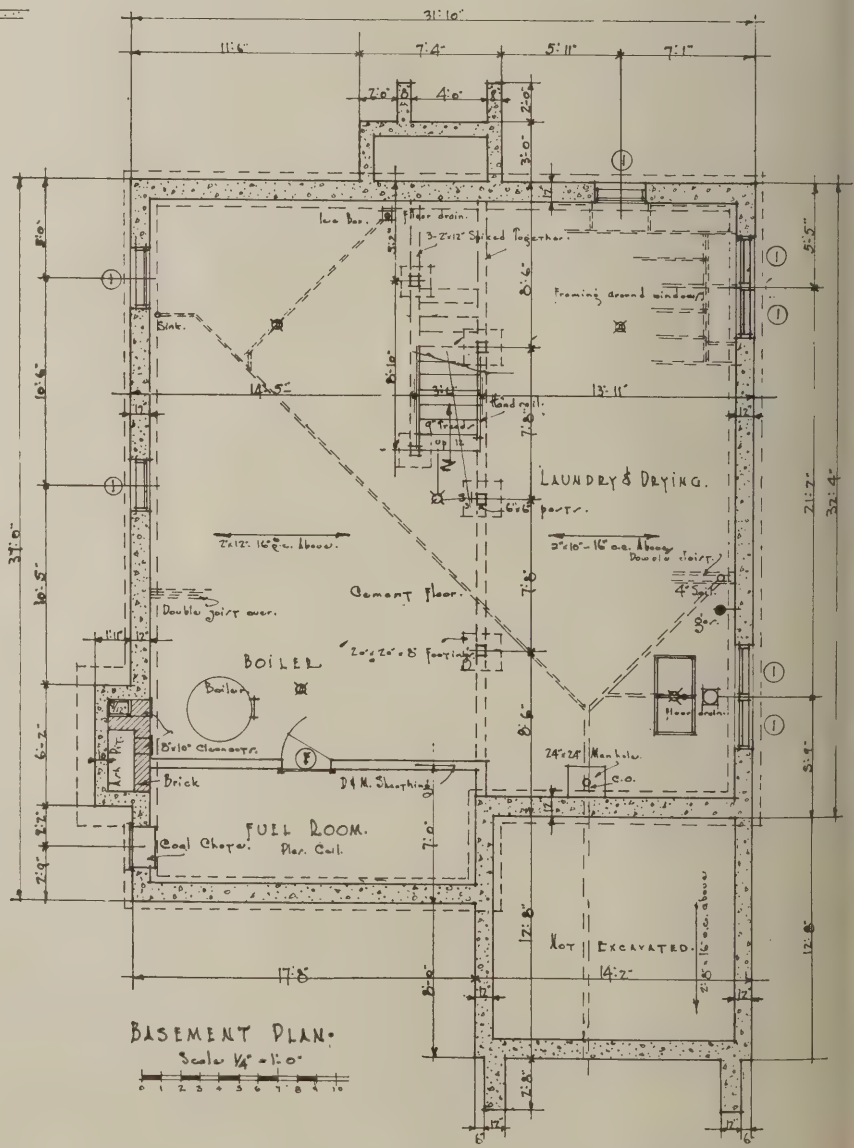
FRONT ELEVATION.
Scale ¼" = 1'-0"



MAIN CORNICE
Scale 1½" = 1'-0"



BASEMENT WINDOWS
Scale 1½" = 1'-0"



BASEMENT PLAN.
Scale ¼" = 1'-0"

SCHEDULE of DOORS.

Quant.	Type	Size	Description	Remarks
1	A	3'-0" x 6'-8" x 1¾"	12 Lt. P.S.gl.	Glt. P.S.gl.
7	B	2'-8" x 6'-8" x 1⅜"	11 Oz	2 panels
1	C	2'-8" x 6'-8" x 1⅜"	See Elev.	Cast. P.S.gl.
10	D	2'-4" x 6'-8" x 1⅜"	11 Oz	2 panels
1	E	2'-8" x 7'-0" x 1⅜"	11 Oz	2 panels
1	F	2'-8" x 6'-8" x 1⅜"	11 Oz	Fir

SCHEDULE of WINDOW.

Quantity	Type	Descrip	Lights	Glass Sizes	Opg. Sizes	Thick.	Remarks
7	1	Hinge	3	10/12	2'-10½" x 1'-4½"	1⅜"	
13	2	D-H	12	14/12	2'-10½" x 4'-6"	1⅜"	
9	3	Casement	6	10/12	2'-0½" x 3'-6"	1¾"	Special
1	4	D-H	16	8/10	3'-0⅜" x 3'-10"	1⅜"	
1	5	D-H	6	8/12	2'-4½" x 2'-6"	1⅜"	Special

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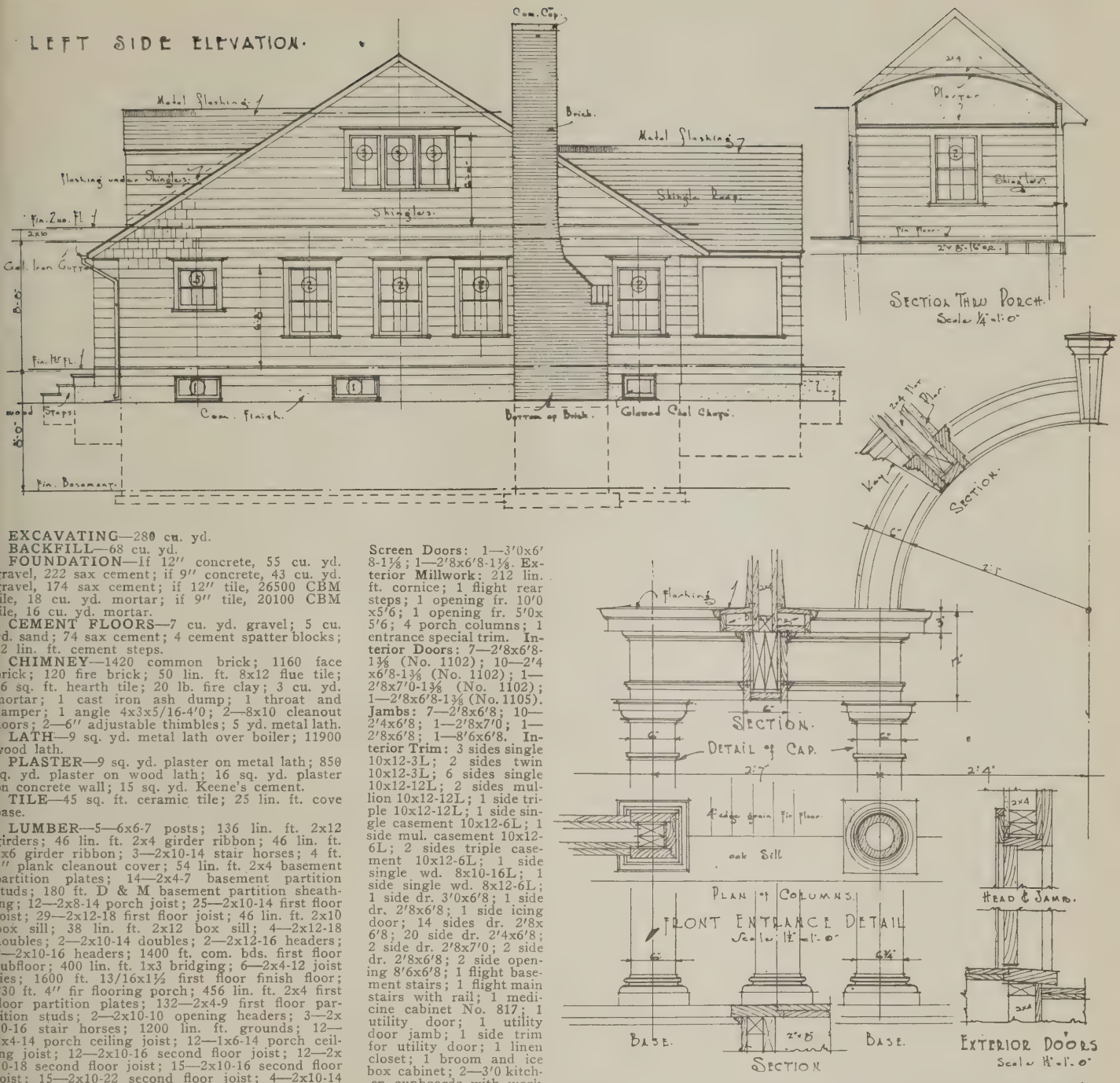
Front elevation, basement plan, construction details and door and window schedules for House No. 5A59, especially designed for National Builder by the Northwestern division of The Arch itects' Small House Service Bureau of the United States, Inc.



EXCAVATING—280 cu. yd.

BACKFILL—68 cu. yd.

FOUNDATION—If 12" concrete, 55 cu. yd. gravel, 222 sax cement; if 9" concrete, 43 cu. yd. gravel, 174 sax cement; if 12" tile, 26500 CBM tile, 18 cu. yd. mortar; if 9" tile, 20100 CBM tile, 16 cu. yd. mortar.

CEMENT FLOORS—7 cu. yd. gravel; 5 cu. yd. sand; 74 sax cement; 4 cement spatter blocks; 22 lin. ft. cement steps.

CHIMNEY—1420 common brick; 1160 face brick; 120 fire brick; 50 lin. ft. 8x12 flue tile; 16 sq. ft. hearth tile; 20 lb. fire clay; 3 cu. yd. mortar; 1 cast iron ash dump; 1 throat and damper; 1 angle 4x3x5/16-4'0; 2—8x10 cleanout doors; 2—6" adjustable thimbles; 5 yd. metal lath.

LATH—9 sq. yd. metal lath over boiler; 11900 wood lath.

PLASTER—9 sq. yd. plaster on metal lath; 850 sq. yd. plaster on wood lath; 16 sq. yd. plaster on concrete wall; 15 sq. yd. Keene's cement.

TILE—45 sq. ft. ceramic tile; 25 lin. ft. cove base.

LUMBER—5—6x6-7 posts; 136 lin. ft. 2x12 girders; 46 lin. ft. 2x4 girder ribbon; 46 lin. ft. 2x6 girder ribbon; 3—2x10-14 stair horses; 4 ft. 2" plank cleanout cover; 54 lin. ft. 2x4 basement partition plates; 14—2x4-7 basement partition studs; 180 ft. D & M basement partition sheathing; 12—2x8-14 porch joist; 25—2x10-14 first floor joist; 29—2x12-18 first floor joist; 46 lin. ft. 2x10 box sill; 38 lin. ft. 2x12 box sill; 4—2x12-18 doubles; 2—2x10-14 doubles; 2—2x12-16 headers; 2—2x10-16 headers; 1400 ft. com. bds. first floor subfloor; 400 lin. ft. 1x3 bridging; 6—2x4-12 joist ties; 1600 ft. 13/16x1½ first floor finish floor; 230 ft. 4" fir flooring porch; 456 lin. ft. 2x4 first floor partition plates; 132—2x4-9 first floor partition studs; 2—2x10-10 opening headers; 3—2x10-16 stair horses; 1200 lin. ft. grounds; 12—2x4-14 porch ceiling joist; 12—1x6-14 porch ceiling joist; 12—2x10-16 second floor joist; 12—2x10-18 second floor joist; 15—2x10-16 second floor joist; 15—2x10-22 second floor joist; 4—2x10-14 second floor joist headers; 1200 ft. com. bds. second floor subfloor; 620 ft. 13/16x1½ second floor finish floor; 4—2x10-14 porch girder; 2—2x10-8 porch girder; 366 lin. ft. 2x4 second floor partition plates; 100—2x4-8 second floor partition studs; 25—2x4-14 ceiling joist; 10—2x4-7 ceiling joist; 62 lin. ft. 1x6 ridge rafter; 64 lin. ft. 1x6 ribbon; 1—2x12-12 step horses; 420 lin. ft. 2x4 outside wall plates; 120—2x4-9 wall studs; 35—2x4-12 gable studs; 10—2x4-12 dormer studs and plates; 54—2x6-26 rafters; 17—2x4-5 rafters; 19—2x4-12 rafters; 2200 ft. boards roof sheathing; 16½ M shingles, roof; 20—2x4-16 lookouts; 2400 shiplap wall sheathing; 14 M shingles; 25—2x4-16 scaffold and extras; 8—2x6-14 scaffold and extras; 9—2x10-16 scaffold and extras.

MILLWORK—Frames: 3 single 10x12-3L-1⅜; 2 twin 10x12-3L-1⅜; 6 single 10x12-12L-1⅜; 2 mullion 10x12-12L-1⅜; 1 triple 10x12-12L-1⅜; 1 single casement 10x12-6L-1¾; 1 mul. casement 10x12-6L-1¾; 2 triple casement 10x12-6L-1¾; 1 single wd. 8x10-16L-1⅜; 1 single wd. 8x12-6L-1⅜. **Windows:** 7 sh. 10x12-3L-1⅜; 13 windows 10x12-12L-1⅜; 9 casements 10x12-6L-1¾; 1 wd. 8x10-16L-1⅜; 1 wd. 8x12-6L-1⅜. **Storm Sash:** 7—10x12-3L-1⅛; 13—10x12-12L-1⅛; 9—10x12-6L-1⅛; 1—8x10-16L-1⅛; 1—8x12-6L-1⅛. **Screens:** 7—10x12-3L-1⅛; 13—10x12-12L-1⅛; 9—10x12-6L-1⅛; 1—8x10-16L-1⅛; 1—8x12-6L-1⅛. **Outside Door Frames:** 1—3'0x6'8-1¾; 1—2'8x6'8-1¾; 1 icing door frame. **Outside Doors:** 1—3'0x6'8-1¾ (No. 1212); 1—2'8x6'8-1¾; 1 icing door. **Storm Doors:** 1—3'0x6'8-1⅛; 1—2'8x6'8-1⅛. **Screen Doors:** 1—3'0x6'8-1⅛; 1—2'8x6'8-1⅛. **Exterior Millwork:** 212 lin. ft. cornice; 1 flight rear steps; 1 opening fr. 10'0 x5'6; 1 opening fr. 5'0x5'6; 4 porch columns; 1 entrance special trim. **Interior Doors:** 7—2'8x6'8-1⅜ (No. 1102); 10—2'4x6'8-1⅜ (No. 1102); 1—2'8x7'0-1⅜ (No. 1102); 1—2'8x6'8-1⅜ (No. 1105). **Jambs:** 7—2'8x6'8; 10—2'4x6'8; 1—2'8x7'0; 1—2'8x6'8; 1—8'6x6'8. **Interior Trim:** 3 sides single 10x12-3L; 2 sides twin 10x12-3L; 6 sides single 10x12-12L; 2 sides mullion 10x12-12L; 1 side triple 10x12-12L; 1 side single casement 10x12-6L; 1 side mul. casement 10x12-6L; 2 sides triple casement 10x12-6L; 1 side single wd. 8x10-16L; 1 side single wd. 8x12-6L; 1 side dr. 3'0x6'8; 1 side dr. 2'8x6'8; 1 side icing door; 14 sides dr. 2'8x6'8; 20 side dr. 2'4x6'8; 2 side dr. 2'8x7'0; 2 side dr. 2'8x6'8; 2 side opening 8'6x6'8; 1 flight basement stairs; 1 flight main stairs with rail; 1 medicine cabinet No. 817; 1 utility door; 1 utility door jamb; 1 side trim for utility door; 1 linen closet; 1 broom and ice box cabinet; 2—3'0 kitchen cupboards with worktables; 1 counter; 1—6'0 seat; 1—3'6 table; 1 mantel shelf; 2 drainboards; 650 lin. ft. base; 650 lin. ft. base shoe; 650 lin. ft. base molding; 30 lin. ft. closet shelving; 30 lin. ft. closet hook strip; 20 lin. ft. closet clothes rod; 120 lin. ft. ceiling cove; 312 lin. ft. picture molding; 30 lin. ft. band molding; 6 lin. ft. threshold. **Note:** If dining and living room trim is changed it will affect the following items listed above: 1 door 3'0x6'8-1¾ (No. 1212); 1 side trim 3'0x6'8; 2 doors 2'8x6'8-1⅜ (No. 1102); 2 jambs 2'8x6'8; 2 side trim 2'8x6'8; 1 dr. 2'4x6'8-1⅜ (No. 1102); 1 side trim 2'4x6'8; 1 jamb 8'6x6'8; 2 side trim 8'6x6'8; 4 sides single wd. trim 10x12-12L; 1 side triple wd. trim 10x12-12L; 1 mantel shelf; 120 lin. ft. ceiling cove; 110 lin. ft. base; 110 lin. ft. base shoe; 110 lin. ft. base molding; 120 lin. ft. picture molding.

INSULATION—1500 sq. ft. insulation for outside walls; 500 sq. ft. insulation for second floor ceiling; 3 rolls felt floors; 4 rolls felt walls; 4 rolls felt roof.

HARDWARE—7 cellar sash sets; 15 sash locks; 15 sash lifts; 9 casement sash sets; 31 storm sash sets; 31 screen sets; 1 front door set with butts; 1 rear door set with butts; 1 icing door set with butts; 2 storm door sets with butts; 2 screen door sets with butts; 18 inside door sets with butts; 1 floor hinge; 2 push plates; 4 stair rail brackets; 3 doz. clothes hooks; 21 door bumpers; 1100 lb. assorted nails; 6 lb. assorted brads; 450 lb. sash weights; 3 hanks sash cord; 1 coal chute; for linen closet: 2 pr. ornamental butts, 1 cupboard turn, 1 blind catch, 10 drawer pulls; for worktable: 1 set castors, 1 drawer pull, 2 pr. ornamental butts, 1 cupboard turn, 1 elbow catch; for broom and ice box cabinet: 4 pr. ornamental butts, 3 cupboard turns, 1 elbow catch; 2 pr. hinges for seat; 4 friction stays—utility door; for kitchen cabinets: 8 pr. ornamental butts, 4 cupboard turns, 4 elbow catches, 3 drawer pulls, 2 brackets; for medicine cabinet: 1 pr. ornamental butts, 1 cupboard turn.

TINWORK—62 lin. ft. ridge roll; 4 finials; 40 lin. ft. valley tin; 70 lin. ft. gutter; 24 gutter hangers; 6 gutter ends; 1 inside miter; 4 nipples; 4 strainers; 4 elbows; 4 offsets; 4 shutoffs; 48 lin. ft. conductor; 12 conductor hooks; 30 lin. ft. flashing tin.

WEATHER STRIPPING—7 sh. 10x12-3L; 13 windows 10x12-12L; 9 sh. 10x12-6L; 1 wd. 8x10-16L; 1 wd. 8x12-6L; 1 dr. 3'0x6'8; 1 dr. 2'8x6'8; 1 icing door.

CAULKING—12 single frames; 4 mullion frames; 3 triple frames; 2 door frames; 1 icing frame; 1 chimney; 1 coal chute.

EXTERIOR PAINTING—5 gal. trim paint; 1 gal. sash color; 1 gal. screen paint; 50 gal. shingle stain roof; 42 gal. shingle stain walls; 1 gal. oil; 1 gal. shellac; 1 gal. porch paint.

INTERIOR PAINTING—8 gal. white paint; 6 gal. enamel; 4 gal. filler stain; 2 gal. shellac; 5 gal. interior varnish; 3 gal. floor shellac; 6 gal. floor varnish; 1 gal. oil; 1 gal. japan; 6 lb. putty; 1 doz. sheets sandpaper; 3 pkg. steel wool.

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Left side elevation, construction details and quantity survey for House No. 5A59 especially designed for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.

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A Farm House That Can Be Built in Units

House No. 6A56, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.

THIS six room farm house is capable of many extensions and new developments of the spaces. It may be built in the first place simply as shown for the first unit in the block plan in the lower left hand corner of page 39. In that case it would be a five room house. Afterward the parlor or bedroom might be added to the left and to the right a wing to include the laundry, wash room, and toilet on the first floor and a men's dormitory on the second floor. Another bedroom can be worked in in the attic space above the parlor. Thus, in the end, the house may become quite commodious.

There is a large porch in the rear running along the whole first unit. It is 37x8 feet, with concrete floor.

The construction of this house is frame walls on masonry foundations, the first story being stuccoed and the second covered with wood siding. The style corresponds to the best traditions of American architecture. The house has the appearance that a farm house should have. It is extensive, no thought having been given to the restrictions which ordinarily limit the size of the city house.

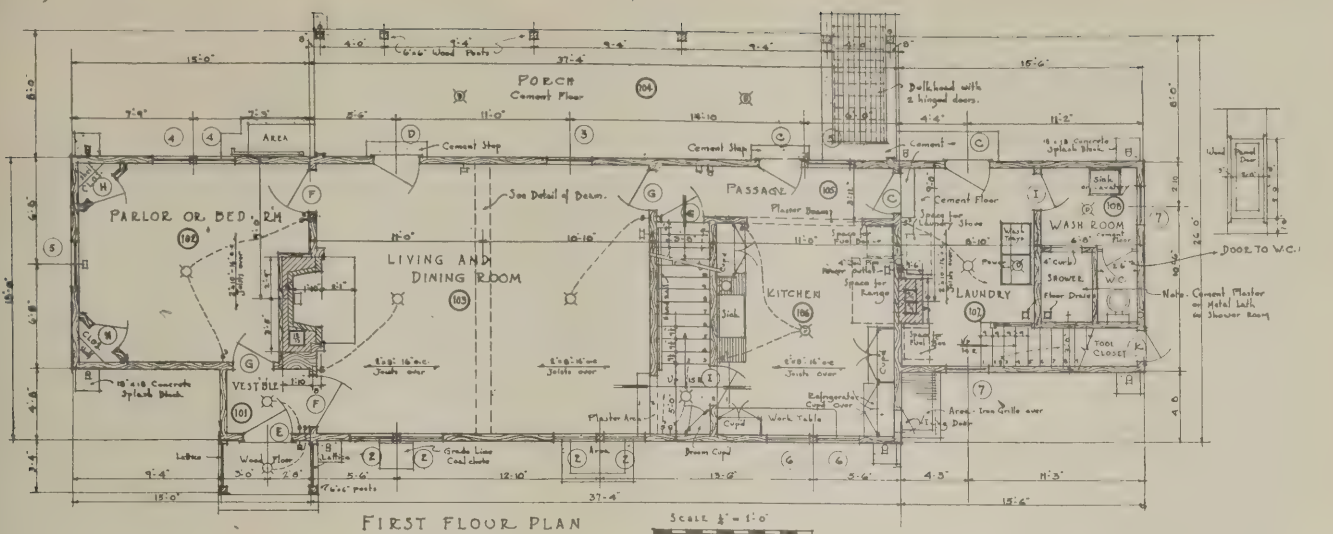
This plan, as you study it over, will be found to contain a truly enormous amount of storage space. Every room has at least one closet, and there is a lot of other space for the storage of things that are required on the modern farm. There is an excavated space under the house provided for heater room, fuel, and storage.

A grade entrance leads from the storage space directly to the outside of the house through a bulkhead. The laundry is placed on the first floor. In the men's dormitory there are individual lockers for men who may be quartered there. The stairway leading from this space makes it possible for men to go to their quarters without going through the main portion of the house, and provision is made for a shower bath, wash room and toilet for them in the room below.

The kitchen is commodious and of a size corresponding to what is necessary for a farm kitchen. The combined living and dining room has area enough so that large tables can be set there on occasion. The kitchen enters upon the porch, which makes it possible for that space screened in to serve as a dining room during harvest periods.

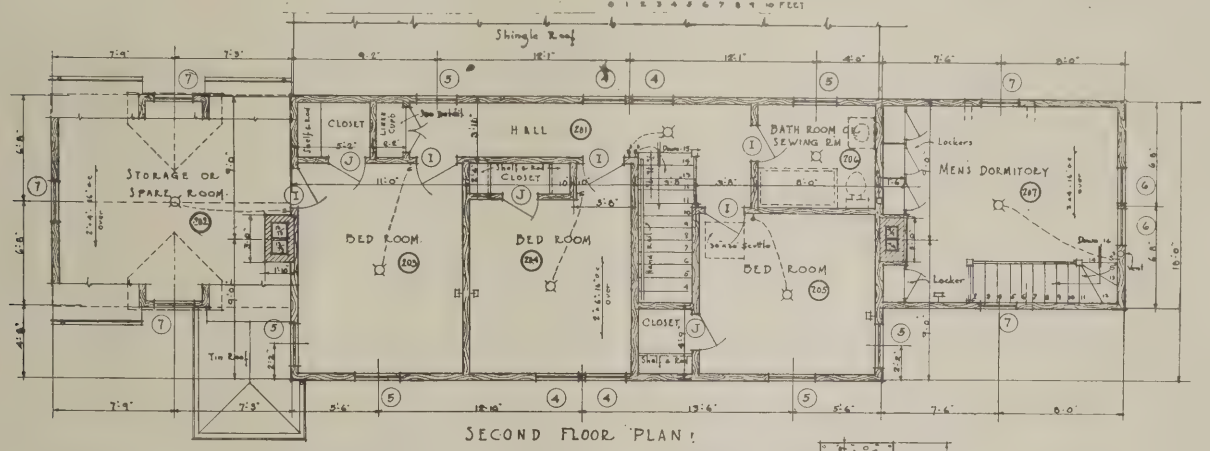
This house should be faced so that the greatest advantage is taken of the best views from the principal rooms and of the prevailing winds.

The regular price of this plan is $30.50. (To NATIONAL BUILDER subscribers $15.50.)

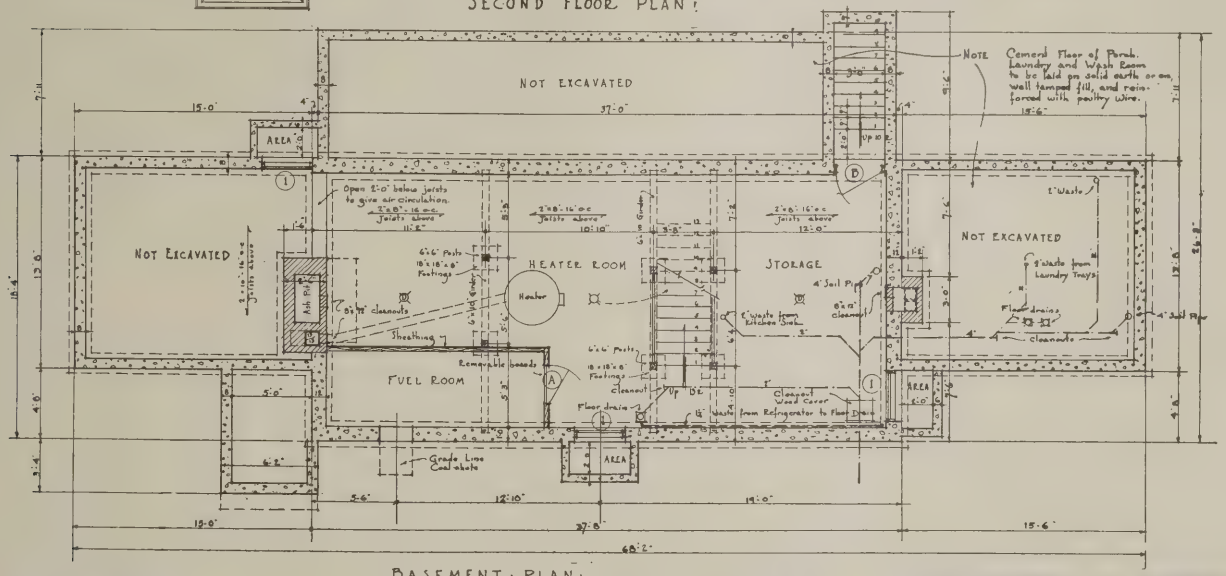


FIRST FLOOR PLAN

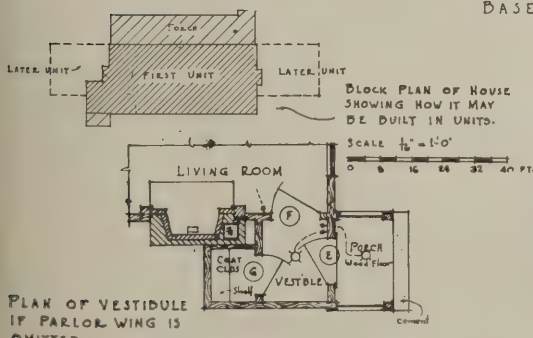
Scale ¼" = 1'-0"



SECOND FLOOR PLAN

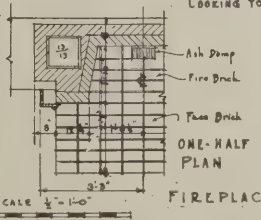


BASEMENT PLAN



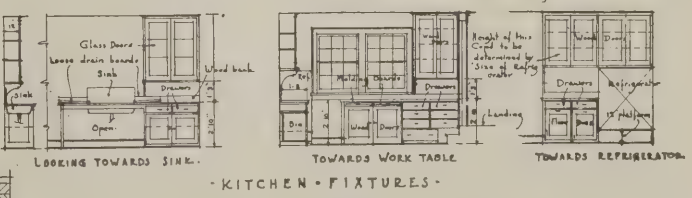
BLOCK PLAN OF HOUSE SHOWING HOW IT MAY BE BUILT IN UNITS.

PLAN OF VESTIBULE IF PARLOR WING IS OMITTED.



ONE-HALF PLAN

FIREPLACE



LOOKING TOWARDS SINK. TOWARDS WORK TABLE TOWARDS REFRIGERATOR.

KITCHEN FIXTURES

BROOM CUPD IN LANDING LINEN CUPD SECTION LOCKERS IN MEN'S DORMITORY

Scale ½" = 1'-0"

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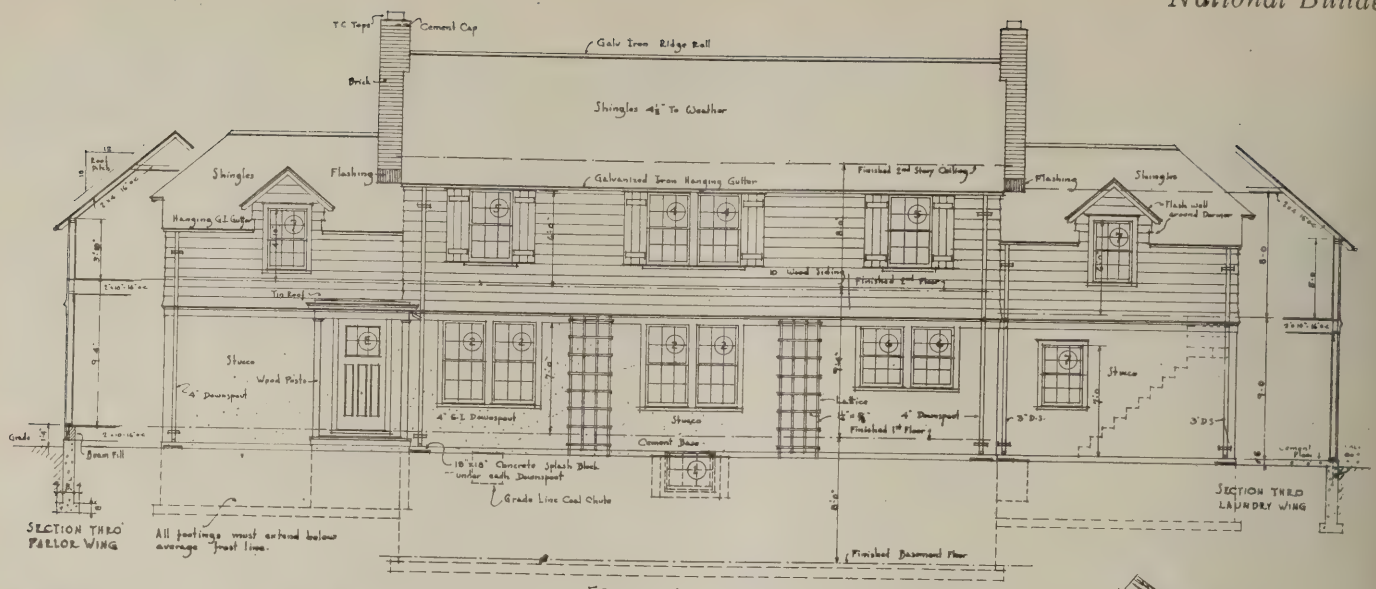
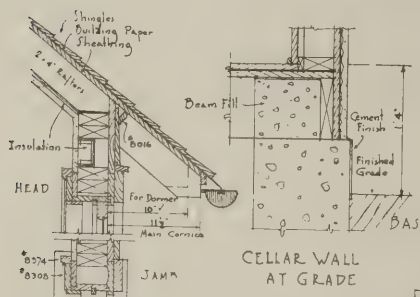
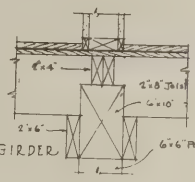
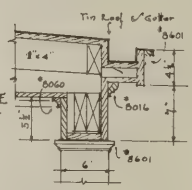
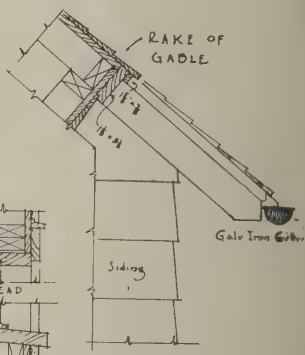
Floor plans and interior details for House No. 6A56, especially designed for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.

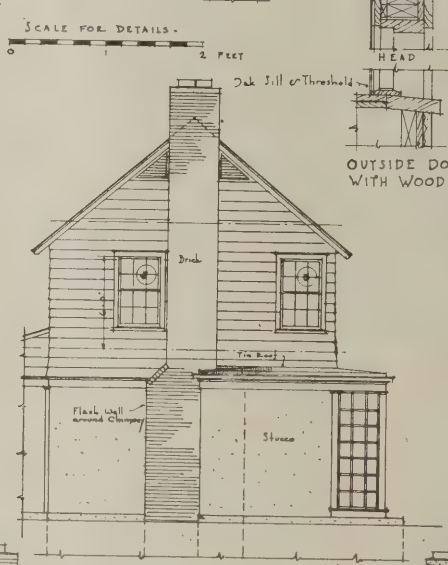


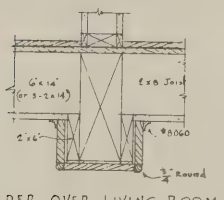


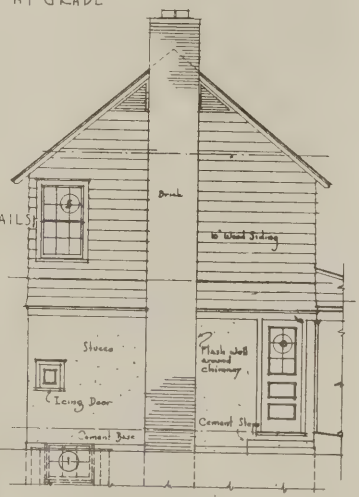


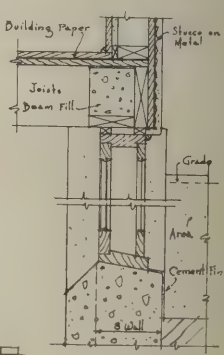


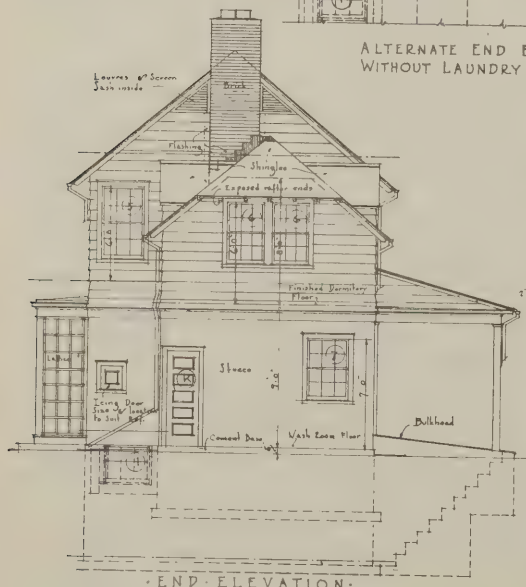


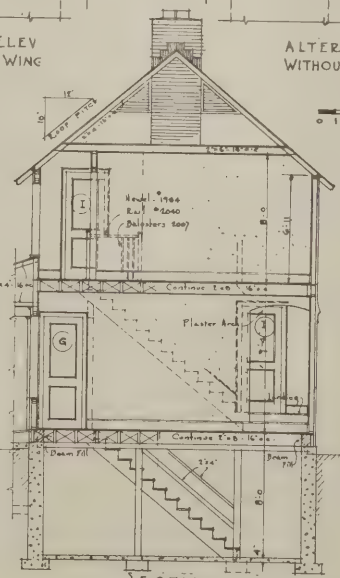


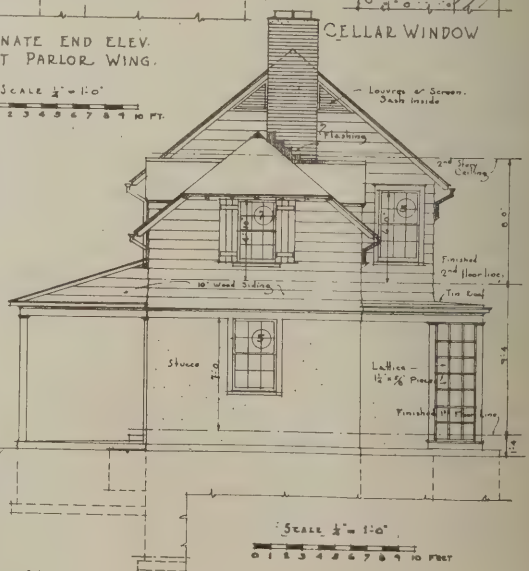












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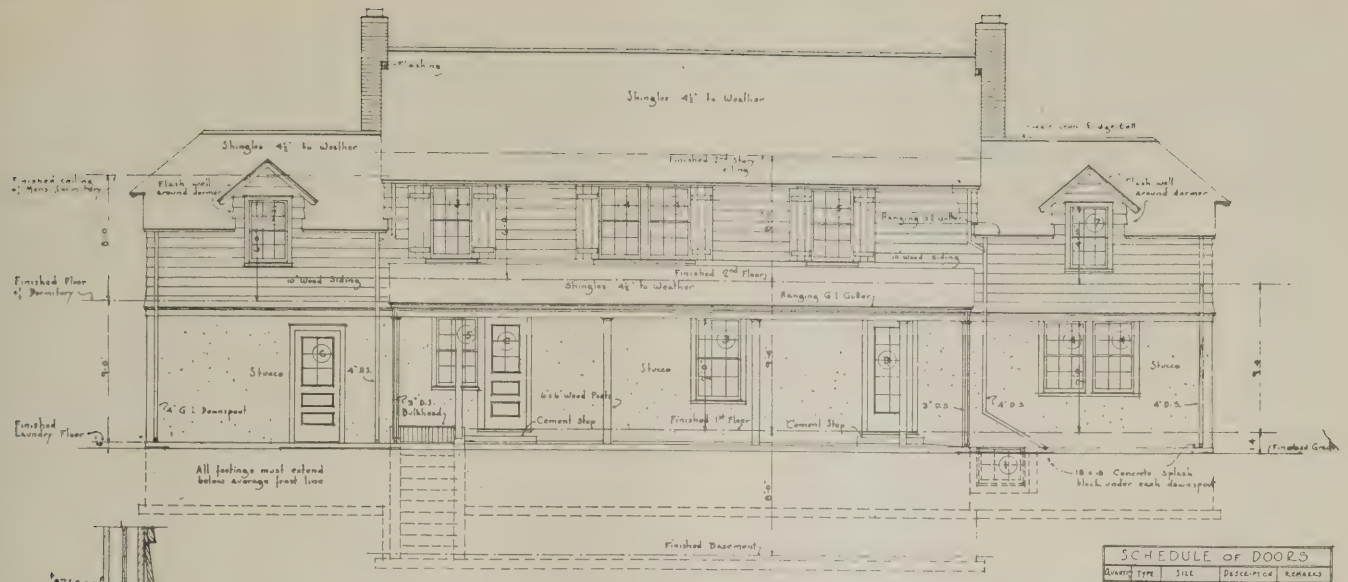
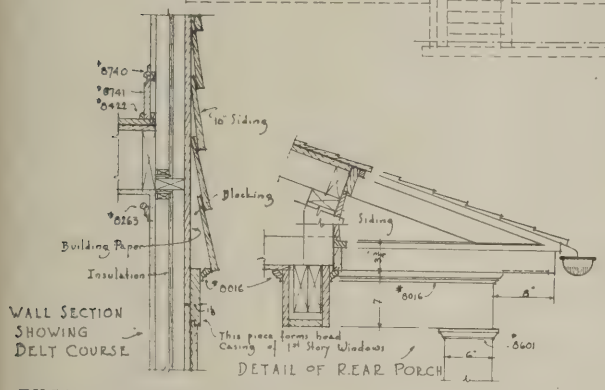
Elevations and construction details for House No. 6A56, especially designed for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.



REAR ELEVATION



WALL SECTION SHOWING DELT COURSE

DETAIL OF REAR PORCH

SCHEDULE OF WINDOWS

Quantity	Type	Description	No. of Lights	Size of Sash	Size of Opng. for Sash	Weight of Sash	Frame
3	1	Cellar	2	10 x 15	2'-0" x 2'-5"	1⅛	See Detail
4	2	Double Hung Mullion	12	10 x 14	2'-10½ x 5'-2"	1⅜	-
1	3	Double Hung	12	10 x 14	2'-10½ x 5'-2"	1⅜	-
6	4	Double Hung Mullion	12	9 x 12	2'-7½ x 4'-6"	1⅜	-
8	5	Double Hung	12	9 x 12	2'-7½ x 4'-6"	1⅜	-
4	6	Double Hung Mullion	12	8 x 10	2'-4½ x 3'-10"	1⅛	-
7	7	Double Hung	12	8 x 10	2'-4½ x 3'-10"	1⅛	-

SCHEDULE OF DOORS

Quantity	Type	Size	Description	Remarks
1	A	2'-6" x 6'-6" x 1⅜	Unit B 720	Full E.M.
1	B	2'-6" x 6'-8" x 1⅜	750	Cellar Ent.
3	C	2'-6" x 7'-0" x 1⅜	Unit A 750	Ent. & Laundry
1	D	3'-0" x 7'-0" x 1⅜	Unit 984	Exterior
1	E	3'-0" x 7'-0" x 1⅜	916	Front Ent.
2	F	3'-0" x 7'-0" x 1⅜	1102	Interior
3	G	2'-6" x 7'-0" x 1⅜	1102	"
2	H	2'-4" x 7'-0" x 1⅜	1102	"
7	I	2'-6" x 6'-8" x 1⅜	1102	"
3	J	2'-4" x 6'-8" x 1⅜	1102	"
1	K	2'-0" x 6'-0" x 1⅜	720	Tool Closet

EXCAVATING—230 cu. yd.

BACKFILL—85 cu. yd.

FOUNDATION—If 12" concrete, 62 cu. yd. gravel, 250 sax cement; if 9" concrete, 54 cu. yd. gravel, 218 sax cement; if 12" tile, 30000 CBM tile, 23 cu. yd. mortar; if 9" tile, 24500 CBM tile, 19 cu. yd. mortar.

CHIMNEY—3480 com. brick; 1200 face brick; 100 fire brick; 40 lin. ft. 8x8 flue tile; 62 lin. ft. 12x12 flue tile; 19 sq. ft. hearth tile; 20 lb. fire clay; 4 cu. yd. mortar; 1 cast iron ash dump; 1 throat and damper; 1 angle 4x3x5/16-4'0"; 4—8x12 clean out doors; 4—6" adjustable thimbles; 6 yd. metal lath.

LATH—9 yd. metal lath over boiler; 168 yd. metal lath for stucco; 13860 wood lath.

PLASTER—9 yd. plaster on metal lath; 168 yd. plaster stucco; 990 yd. plaster on wood lath; 15 yd. Keene's cement.

CEMENT FLOOR—9 cu. yd. gravel; 5 cu. yd. sand; 96 sax cement; 4 spatter blocks.

TILE FLOORS—54 sq. ft. ceramic tile; 27 lin. ft. cove base.

LUMBER—6—6x6-7 posts; 3—6x10-18 girders; 12—2x6-18 girder ribbons; 12—2x4-18 girder plates; 3—2x10-14 stair horses; 60 lin. ft. 2x4 basement partition plates; 16—2x4-7 basement partition studs; 200 ft. D & M basement partition sheathing; 10—2x8-14 first floor joist; 6—2x8-20 first floor joist; 15—2x8-22 first floor joist; 15—2x8-16 first floor joist; 30 lin. ft. 2x10 box sill; 74 lin. ft. 2x8 box sill; 4—2x8-16 headers and doubles; 2—2x10-16 headers and doubles; 1100 ft. com. bds. first floor subfloor; 1254 ft. 13/16x 1½ first floor finish floor; 400 lin. ft. 1x3 bridging; 1350 lin. ft. grounds; 4 ft. of 2" plank clean out cover; 336 lin. ft. 2x4 first floor partition plates; 100—2x4-9 first floor partition studs; 4—2x10-16 stair horses to second floor; 1—6x14-18 beam; 2—2x6-18 beam ribbon; 166 lin. ft. 1x4 ribbon; 15—2x10-14 second floor joist; 15—2x8-16 second floor joist; 15—2x8-22 second floor joist; 13—2x10-14 second floor joist; 2—2x6-18 second floor joist; 3—2x10-16 second floor joist headers; 3—2x8-16 second floor joist headers; 1300 ft. com. bds. second floor subfloor; 1500 ft. 13/16x1½ second floor finish floor; 372 lin. ft. 2x4 second floor partition plates; 110—2x4-8 second floor partition studs; 12—2x4-12 second floor ceiling joist; 12—2x4-14 second floor ceiling joist; 28—2x6-16 second floor ceiling joist; 2—2x6-14 headers; 2—2x4-14 headers; 26—2x4-10 rafters; 28—2x4-10 rafters; 58—2x4-14 rafters; 62 lin. ft. 1x6 ribbon rafter; 504 lin. ft. 2x4 outside wall plates; 147—2x4-16 outside wall studs; 30—2x4-14 outside wall studs; 16—2x4-12 outside wall studs; 2600 ft. shiplap outside wall sheathing; 1300 ft. siding outside wall sheathing; 4—2x4-16 dormer rafters; 10—2x4-14 ridge rafters and look outs; 1800 ft. com. bds. roof sheathing; 14M shingles; 620 ft. D & M attic floor; 360 ft. ceiling cornice; 320 ft. ceiling porch; 30 ft. flooring porch; 4—2x6-8 porch girders; 2—2x6-14 porch girders; 2—2x6-24 porch girders; 32—2x4-8 porch ceiling joist; 32—2x4-9 porch rafters; 2—2x6-6 porch girders; 4—2x6-3 porch girders; 3—2x4-16 ceiling joist and rafters; 35—2x4-16 scaffold and extras; 8—2x6-14 scaffold and extras; 4—2x10-16 scaffold and extras; 6—2x8-16 scaffold and extras; 3—2x10-16 laundry stair horses; 1—2x12-16 step horses.

MILLWORK—Frames: 3—10x12-6L-1⅜; 2 mul.—10x14-12L-1⅜; 1 single—10x14-12L-1⅜; 3 mul.—9x12-12L-1⅜; 8 single—9x12-12L-1⅜; 2 mul.—8x10-12L-1⅜; 7 single—8x10-12L-1⅜; 4 louvre frames. **Windows:** 3 sash 10x12-6L-1⅜; 4 windows 10x14-12L-1⅜; 1—10x14-12L-1⅜; 6—9x12-12L-1⅜; 8—9x12-12L-1⅜; 4—8x10-12L-1⅜; 7—8x10-12L-1⅜. **Storm Sash:** 3—10x12-6L-1⅛; 5—10x14-12L-1⅛; 14—9x12-12L-1⅛; 11—8x10-12L-1⅛; 4—for louvres. **Screens:** 3—10x12-6L-1⅛; 5—10x14-12L-1⅛; 14—9x12-12L-1⅛; 11—8x10-12L-1⅛; 4—for louvres. **Shutters:** 1 pr. for windows 10x14-12L-1⅛; 4 pr. for windows 9x12-12L-1⅛; 3 pr. for windows 9x12-12L-1⅛; 1 pr. for windows 8x10-12L-1⅛. **Outside Door Frames:** 2—2'8x7'0-1¾; 1—3'0x7'0-1¾; 1—3'0x7'0-1¾; 1—2'0x6'0-1⅜; 1 icing door frame. **Outside Doors:** 2—2'8x7'0-1¾ (No. 750); 1—3'0x7'0-1¾ (No. 984); 1—3'0x7'0-1¾ (No. 916); 1—2'0x6'0-1⅜ (No. 720); 1 icing door. **Storm Doors:** 2 dr. 2'8x7'0-1⅛; 2 sh. 3'0x7'0-1⅛; 1 sh. 2'0x6'0-1⅛. **Screen Doors:** 2—2'8x7'0-1⅛; 2—3'0x7'0-1⅛; 1—2'0x6'0-1⅛. **Outside Millwork:** 300 lin. ft. cornice; 54 lin. ft. porch facia; 54 lin. ft. porch soffit; 54 lin. ft. porch inside facia; 208 lin. ft. belt; 208 lin. ft. water drip; 8 porch columns; 2 lattice frames 2'6x8'6; 2 lattice frames 2'6x7'6; 1 bulk head door frame; 1 pr. bulk head doors. **Interior Doors:** 1—2'6x6'8-1⅜ (No. 720); 1—2'8x6'8-1¾ (No. 750); 1—2'8x7'0-1¾ (No. 750); 2—3'0x7'0-1⅜ (No. 1102); 3—2'8x7'0-1⅜ (No. 1102); 2—2'4x7'0-1⅜ (No. 1102); 7—2'6x6'8-1⅜ (No. 1102); 3—2'4x6'8-1⅜ (No. 1102). **Jambs:** 1—2'6x6'8; 1—2'8x6'8; 1—2'8x7'0; 2—3'0x7'0; 3—2'8x7'0; 2—2'4x7'0; 7—2'6x6'8; 3—2'4x6'8; 1—2'0x6'8. **Interior Trim:** 3 side 10x 12-6L; 2 side mul. 10x14-12L; 1 side single 10x 14-12L; 3 side mul. 9x12-12L; 8 side single 9x 12-12L; 2 side mul. 8x10-12L; 7 side single 8x10-12L; 4 side louvre; 2 side dr. 2'8x7'0; 2 side dr. 3'0x7'0; 1 side dr. 2'0x6'0; 1 side icing door; 2 side dr. 2'6x6'8; 2 side dr. 2'8x6'8; 2 side dr. 2'8x7'0; 4 side dr. 3'0x7'0; 6 side dr. 2'8x7'0; 4 side dr. 2'4x7'0; 14 side dr. 2'6x6'8; 6 side dr. 2'4x6'8; 1 flight bsmt. stair with rail; 1 flight main stair with rail; 1 flight rear stair with rail; 2 side oppg. 2'0x6'8; 1 closet door; 1 closet door jamb; 2 closet door side trim; 1—7'0 kitchen cupboard; 1—3'0 kitchen cupboard; 1—7'6 kitchen worktable; 2 drainboards; 1—3'0 kitchen cupboard; 1 mantel shelf; 1—2'3 locker; 1—7'0 locker; 1 medicine cabinet; 1—30"x30" scuttle door; 1 jamb 30x30; 1 side trim 30x30; 1—3'6 linen closet; 700 lin. ft. base; 700 lin. ft. base shoe; 700 lin. ft. base molding; 30 lin. ft. closet shelving; 76 lin. ft. ceiling cove; 300 lin. ft. picture molding; 150 lin. ft. chair rail; 30 lin. ft. hook strip; 14 lin. ft. threshold. **Note:** If living room and vestibule trim is changed, it will affect the following items: 1 dr. 3'0x7'0-1¾ (No. 916); 1 side trim 3'0x7'0; 2 doors 3'0x7'0-1⅜ (No. 1102); 2 jambs 3'0x7'0; 3 side trim 3'0x7'0; 2 doors 2'8x7'0-1⅜ (No. 1102); 1 jamb 2'8x7'0; 2 side trim 2'8x7'0; 1 step and 2 risers on main stairs; 1 mantel shelf; 1 door 3'0x7'0-1¾ (No. 984); 1 side trim 3'0x7'0; 2 side trim for mul. wds. 10x14-12L; 1 side trim for single wds. 10x14-12L; 80 lin. ft. ceiling cove; 74 lin. ft. base; 74 lin. ft. base shoe; 74 lin. ft. base molding; 74 lin. ft. picture molding; 540 ft. 13/16x1½ finish flooring.

TINWORK—78 lin. ft. ridge roll; 8 finials; 28 lin. ft. hip roll; 30 lin. ft. valley tin; 42 lin. ft. flashing tin; 60 sq. ft. tin deck; 176 lin. ft. gutter; 40 gutter hangers; 24 gutter ends; 2 outside miters; 16 nipples; 16 strainers; 16 elbows; 16 offsets; 10 shutoffs; 154 lin. ft. conductor; 24 conductor hooks; 6 sheets sheet tin; 350 tin shingles.

HARDWARE—3 cellar sash sets; 30 sash locks; 30 sash lifts; 37 storm sash sets; 9 set shutter hardware for pairs; 5 outside door sets with butts; 1 icing door set with butts; 5 screen door sets with butts; 5 storm door sets with butts; 1 bulk head double door set with strap hinges; 1 floor hinge; 2 push plates; 19 inside door sets with butts; 25 door bumpers; 4 doz. clothes hooks; 8 stair rail brackets; 1 toilet door set with butts; 1 coal chute; 920 lb. sash weights; 14 kegs assorted nails; 6 lb. assorted brads; 6 hanks sash cord; for kitchen cupboard: 4 pr. ornamental butts, 2 cupboard turns, 2 blind catches, 8 drawer pulls, 2 molding board pulls; for kitchen cabinet: 2 bin pulls, 2 sets castors, 4 drawer pulls, 4 pr. ornamental butts, 2 cupboard turns, 2 elbow catches; 1 bracket for drainboard; for sink cabinet: 4 pr. ornamental butts, 2 cupboard turns, 2 elbow catches, 2 drawer pulls; for broom cabinet: 1 inside door set, 1 pr. butts; for linen cupboard: 4 pr. ornamental butts, 2 cupboard turns, 2 elbow catches; for lockers: 4 pr. butts, 4 inside sets; medicine cabinet; 1 pr. ornamental butts, 1 cupboard turn; 1 pr. hinges for scuttle door.

REINFORCING STEEL—470 sq. ft. chicken wire.

INSULATION—2500 ft. ½ vegetable fibre walls; 1000 ft. ½ vegetable fibre ceiling; 4 rolls felt floors; 6 rolls felt walls; 5 rolls felt roof.

WEATHER STRIPPING—3 sh. 10x12-6L; 5 wds. 10x14-12L; 14 wds. 9x12-12L; 11 wds. 8x10-12L; 2 doors 2'8x7'0; 2 doors 3'0x7'0; 1 door 2'0x6'0; 1 icing door.

CAULKING—23 single frames; 7 mullion frames; 5 door frames; 1 icing frame; 1 coal chute; 2 chimneys.

EXTERIOR PAINTING—7 gal. body paint; 4 gal. trim paint; 2 gal. oil; ½ gal. shellac; 1 gal. sash color; 1 gal. screen paint; ½ gal. shutter paint; ¼ gal. porch floor; 1½ gal. porch ceiling; 42 gal. shingle stain.

INTERIOR PAINTING—11 gal. white paint; 8 gal. enamel; 4 gal. filler stain; 3 gal. shellac; 6 gal. varnish; 4 gal. floor shellac; 5 gal. floor varnish; 1 gal. oil; 1 gal. japan; 1 gal. alcohol; 6 lb. putty; 2 doz. sheets sandpaper; 3 pkgs. steel wool.

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Rear elevation, construction details and quantity survey for House No. 6A56, especially designed for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.

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A True Dutch Colonial House

House No. 5A60, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.

There are today many houses called Dutch Colonial through courtesy and the shape of the roof. The shade of an early Dutch Colonist returning to earth would be puzzled as to why these houses should claim kinship with the old Dutch homes as he knew them.

Here is a five-room "true" Dutch Colonial —true because it has not only the well proportioned Dutch gambrel roof, but the hood over the door and the small single dormers characteristic of the old Dutch Colonial homes. Solid shutters at the first floor windows and quaint side lights around the door carry out the Dutch Colonial spirit. There is a brick pavement and front stoop such as many an early Dutch woman scrubbed to shining cleanliness in the long ago. Yet withal this is a home that is extremely modern in room arrangement, convenience, and comfort.

The construction is a combination brick veneer and wood siding finish on masonry and frame walls with a concrete foundation.

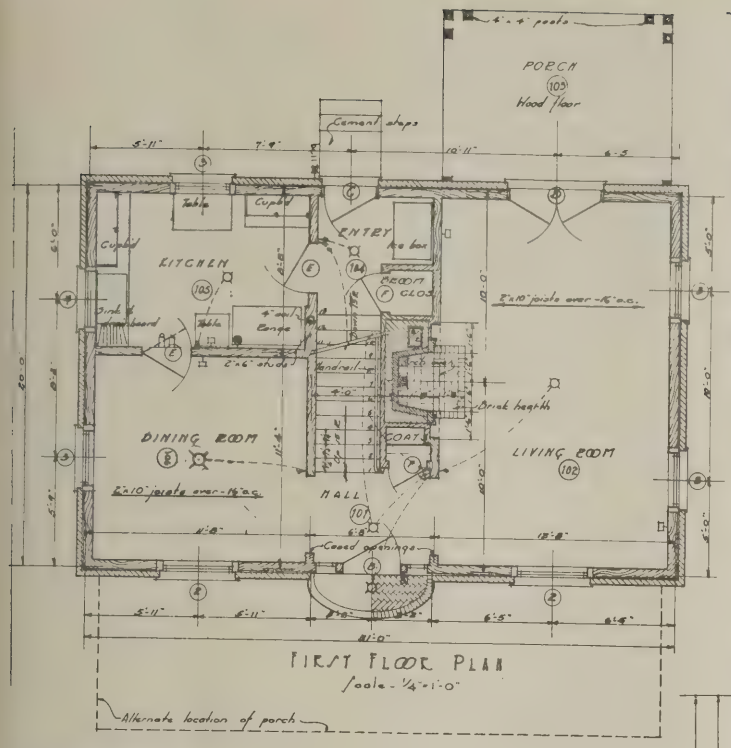
This same floor plan was shown in the January issue of the National Builder with stucco on tile, No. 5A50, and in the March issue with wood shingles on frame construction, No. 5A53. These designs offer the contractor the unusual advantage of three exteriors for one floor plan.

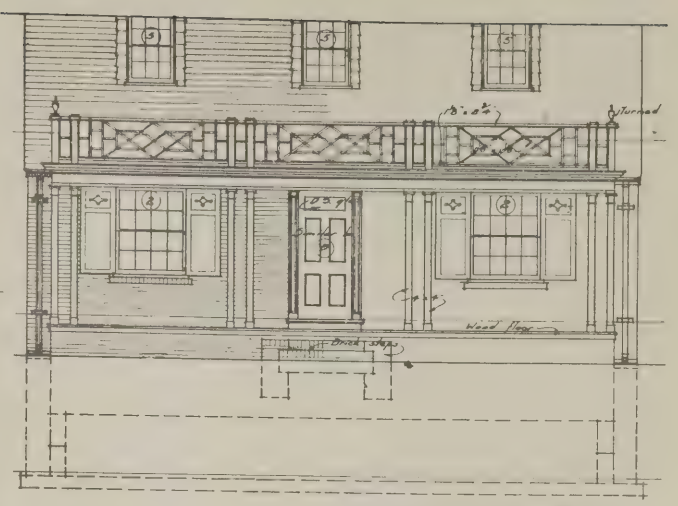
The house is 31 feet wide and 20 feet deep —the porch 12x9 feet. This house is designed for a 40-foot lot, with porch, as pictured. For a wider lot the porch can be placed at the side. It is designed to face north or west and the plans should be reversed for other facings.

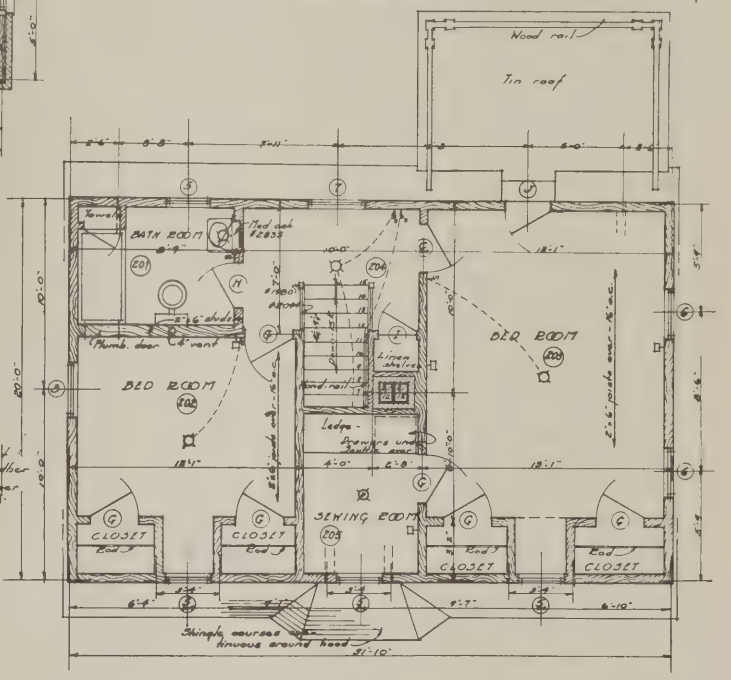
Each of the two large bedrooms has two fine closets. There is a small sewing room with a large cupboard. In fact, the large number of closets is a feature of this plan, for coat, broom and linen closets, as well as closets in the bedrooms, have been provided.

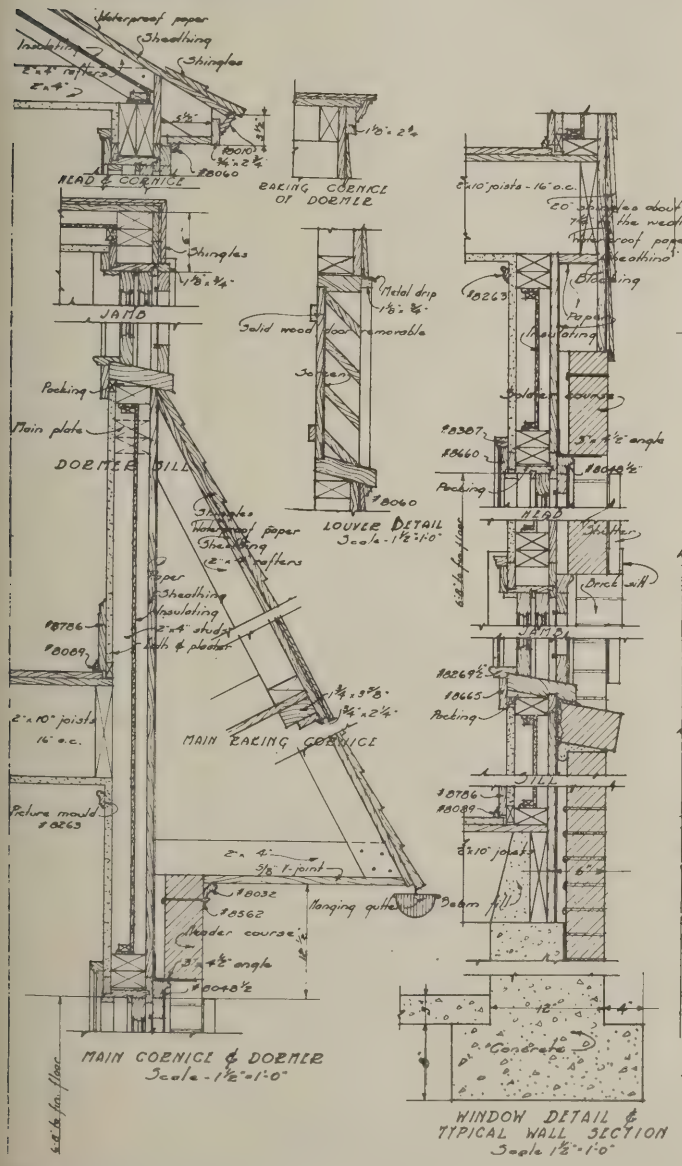
An alternate detail provides for a dining alcove. Many women are demanding this in addition to a regular dining room.

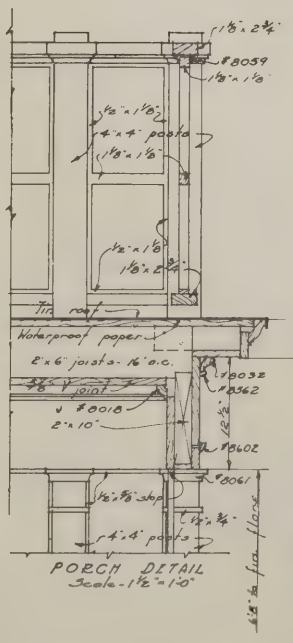
The price of this plan is $25. (To NATIONAL BUILDER subscribers $13.)

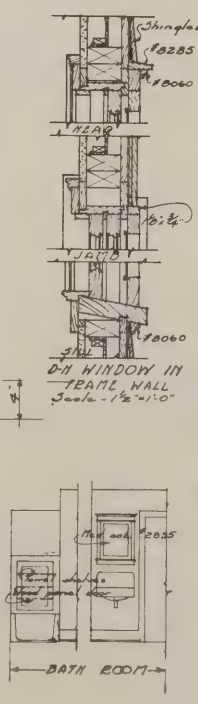


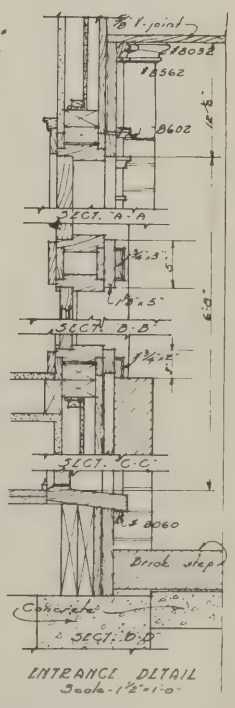












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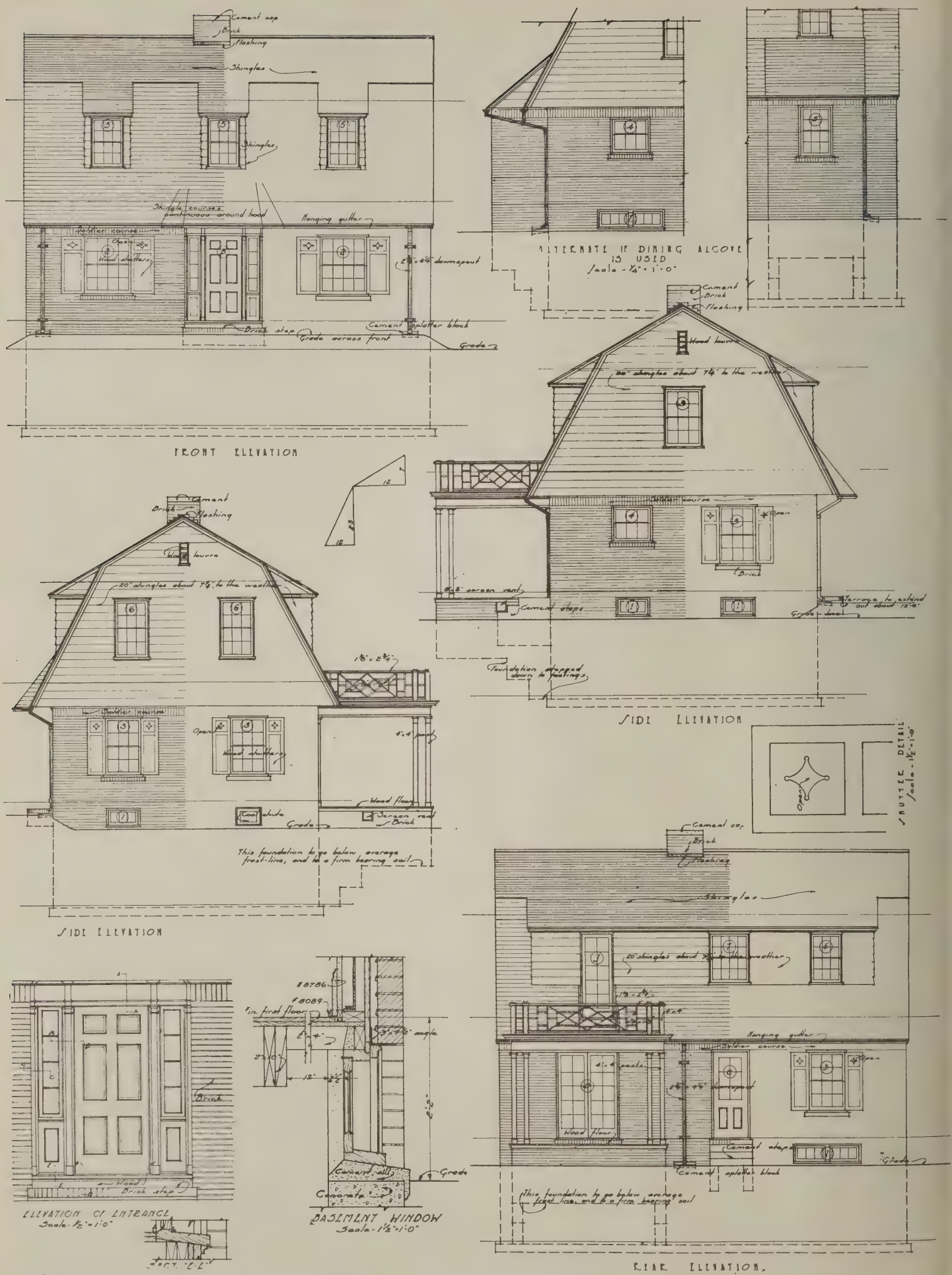
Plans and construction details for House No. 5A60, especially designed for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.



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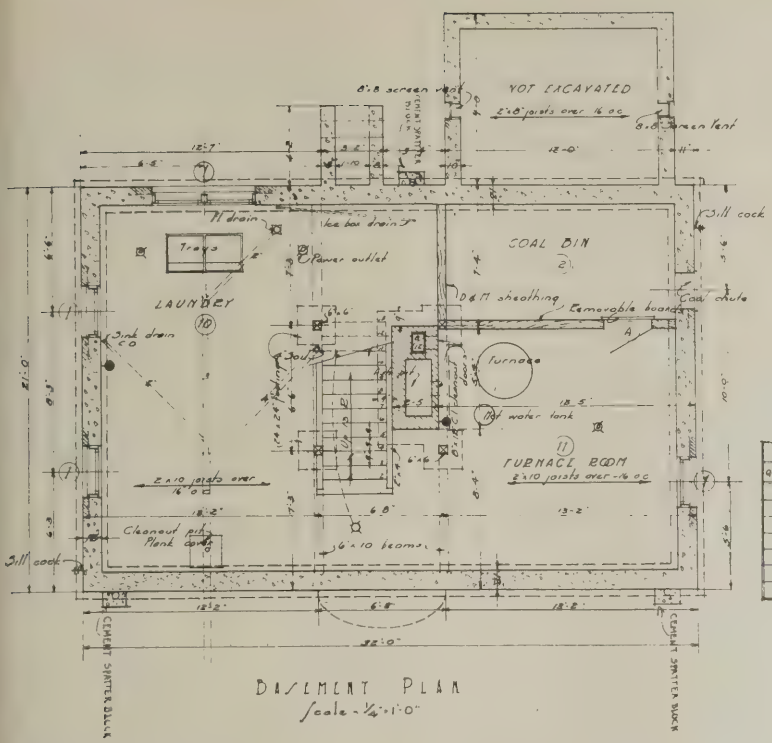
Elevations for House No. 5A60, especially designed for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.



BASEMENT PLAN
Scale - 1/4"-1'-0"

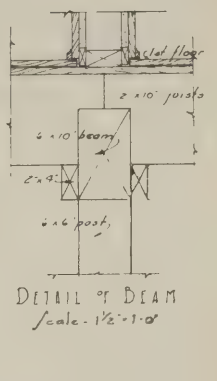
ALTERNATE, SHOWING DINING ROOM
Scale - 1/4"-1'-0"

SCHEDULE OF DOORS

QUANTITY	TYPE	SIZE	DESCRIPTION	REMARKS
	A	2'-6"x6'-8"x1 3/8"	Unit. #120	5 panel
1	B	3'-0"x6'-8"x1 3/8"	Unit. #1130	With sidelights
1	C	2'-8"x6'-8"x1 3/8"	Unit. #140	Door
1	D	2'-4"x6'-8"x1 3/8"	Double French	Porch
2	E	2'-8"x6'-8"x1 3/8"	Unit. #1130	Interior
2	F	2'-0"x6'-8"x1 3/8"	"	"
7	G	2'-6"x6'-6"x1 3/8"	"	"
1	H	2'-8"x6'-6"x1 3/8"	"	"
1	I	2'-0"x6'-6"x1 3/8"	"	"
1	J	2'-4"x6'-6"x1 3/4"	French	

SCHEDULE OF WINDOWS

QUANTITY	TYPE	DESCRIPTION	NO. OF LIGHTS	SIZE OF GLASS	SIZE OF OPNG. FOR SASH OR FRAME	BRACELESS OR CORD	FRAME
5	1	Cellar sash	9	8"x10"	2'-4" x 1'-3"	1 3/8"	See Detail
2	2	Double hung	16	10"x18"	3'-8"x4'-6"	1 3/4"	"
5	3	"	12	10"x12"	2'-10"x4'-6"	1 3/8"	"
1	4	"	3	10"x18"	2'-10"x2'-8"	"	"
3	4	"	12	8"x10"	2'-4"x3'-10"	"	"
2	6	"	12	8"x12"	2'-4"x4'-6"	"	"
1	7	"	16	8"x10"	3'-0"x3'-10"	1 3/4"	"



DETAIL OF BEAM
Scale - 1 1/2"-1'-0"

EXCAVATING—150 cu. yd.

BACKFILL—35 cu. yd.

FOUNDATION—If 12" concrete, 36 cu. yd. gravel, 146 sax cement; if 9" concrete, 28 cu. yd. gravel, 114 sax cement; if 12" tile, 17600 CBM tile, 14 cu. yd. mortar; if 9" tile, 13320 CBM tile, 11 cu. yd. mortar.

CEMENT FLOORS—4 cu. yd. gravel; 3 cu. yd. sand; 43 sax cement; 3 spatter blocks.

FACE BRICK—8480 face brick; 6 cu. yd. mortar; 400 lb. mortar color.

CHIMNEY—2500 common brick; 260 face brick; 120 fire brick; 56 lin. ft. 8x12 flue tile; 16 sq. ft. hearth tile; 20 lb. fire clay; 2½ cu. yd. mortar; 1 cast iron ash dump; 1 throat and damper; 1 angle 4x3x5/16—4' 0; 2—8x12 clean out doors; 2—6" adjustable thimbles; 3 sq. yd. metal lath.

LATH—9 sq. yd. metal lath; 8232 wood lath.

PLASTER—9 sq. yd. plaster on metal lath; 588 sq. yd. plaster on wood lath; 15 sq. yd. Keene's cement.

TILE FLOORS—48 sq. ft. ceramic tile; 25 lin. ft. cove base.

LUMBER—4—6x6-7 posts; 2—6x10-20 girders; 4—2x4-20 girder ribbon; 3—2x10-14 stair horses; 3—2x4-18 basement partition plates; 12—2x4-7 basement partition studs; 180 ft. D. & M. basement partition sheathing; 8—2x8-12 porch floor joist; 135 ft. 4" flooring porch floor; 120 ft. 4" ceiling porch ceiling; 16—2x10-12 first floor joist; 16—2x10-20 first floor joist; 640 ft. com. bds. 1st floor subfloor; 850 ft. 13/16x1½ finish flooring 1st floor; 2—2x10-14 joist doubles; 2—2x10-12 joist doubles; 4—2x10-10 box sill; 2—2x8-9 box sill; 4 ft. 2" plank clean out cover; 300 lin. ft. 1x3 bridging; 210 lin. ft. 2x4 first floor partition plates; 64—2x4-9 first floor partition stud; 3—2x12-16 first floor stair horses; 4—1x6-10 ribbon; 900 lin. ft. grounds; 16—2x10-12 second floor joist; 16—2x10-20 second floor joist; 2—2x10-14 second floor joist doubles; 2—2x10-12 second floor joist doubles; 640 ft. com. bds. second floor subfloor; 780 ft. 13/16x1½ second floor finish floor; 252 lin. ft. 2x4 second floor partition plates; 74—2x4-8 second floor partition studs; 24—2x6-14 second floor ceiling joist; 4—2x4-16 second floor ceiling joist; 32 lin. ft. 1x6 ridge rafter; 294 lin. ft. 2x4 outside wall plates; 82—2x4-12 outside wall studs; 20—2x4-10 outside wall gable studs; 9—2x4-16 dormer plates and studs; 6—4x4-7 porch post coves; 4—2x8-9 porch girders; 2—2x8-12 porch girders; 10—2x6-10 porch roof joist; 50—2x4-14 rafters; 25—2x4-16 rafters; 4—2x4-12 rafters; 1500 ft. com. bds. roof sheathing; 12M shingles—roof; 1900 ft. shiplap wall sheathing; 4½M shingles for dormer and gables; 25—2x4-16 look outs; 14—2x4-16 scaffold and extra; 8—2x6-16 scaffold and extras; 7—2x8-14 scaffold and extras; 8—2x10-12 scaffold and extras; 160 ft. D & M porch roof sheathing.

MILLWORK—Frames: 3 single 8x10-3L-1¾; 1 twin 8x10-3L-1⅜; 2 single wd. 10x12-16L-1¾; 5 single wd. 10x12-12L-1⅜; 1 single wd. 10x12-3L-top—10x14-3L-bot.-1⅜; 4 single wd. 8x10-12L-1⅜; 2 single wd. 9x12-12L-1⅜; 1 single wd. 8x10-16L-1¾; 2 louvre frames. **Windows:** 5 sash 8x10-3L-1⅜; 2 wds. 10x12-16L-1¾; 5—10x12-12L-1⅜; 1—10x12-3L top; 10x14-3L bot.-1⅜; 4—8x10-12L-1⅜; 2—9x12-12L-1⅜; 1—8x10-16L-1¾. **Storm Sash:** 5—8x10-3L-1⅛; 2—10x12-16L-1⅛; 5—10x12-12L-1⅛; 1—10x12-3L top; 10x14-3L bot.-1⅛; 4—8x10-12L-1⅛; 2—9x12-12L-1⅛; 1—8x10-16L-1⅛; 2—for louvres. **Screens:** 5—8x10-3L-1⅛; 2—10x12-16L-1⅛; 5—10x12-12L-1⅛; 1—10x12-3L top; 10x14-3L bot.-1⅛; 4—8x10-12L-1⅛; 2—9x12-12L-1⅛; 1—8x10-16L-1⅛; 2—for louvres. **Shutters:** 2 pr. for windows 10x12-16L-1⅛; 4 pr. for windows 10x12-12L-1⅛. **Outside Door Frames:** 1—3'0x6'8-1¾ with sidelights; 1—2'8x6'8-1¾; 1 double 4'8x6'8-1¾; 1—2'4x6'6-1¾. **Outside Doors:** 1 dr. 3'0x6'8-1¾ (No. 1130); 2 side lights—see detail; 2 doors 2'4x6'8-1¾ french; 1—2'4x6'6-1¾ french; 1—2'8x6'8-1¾ (No. 740). **Storm Doors:** 1—3'0x6'8-1⅛; 2 st. sh. for sidelights; 1 pr. st. doors for opening 4'8x6'8-1⅛; 1 st. dr. 2'4x6'6-1⅛; 1 st. dr. 2'8x6'8-1⅛. **Screen Doors:** 1—3'0x6'8-1⅛; 1 pr. opening 4'8x6'8; 1—2'4x6'6-1⅛; 1—2'8x6'8-1⅛. **Outside Millwork:** 268 lin. ft. cornice; 30 lin. ft. deck rail and newels; 6 porch column casings; 2—½ porch column casing; 30 lin. ft. porch facia; 30 lin. ft. porch soffit; 30 lin. ft. porch inside facia; 44 lin. ft. porch cove. **Interior Doors:** 1—2'6x6'8-1⅜ (No. 720); 2—2'8x6'8-1⅜ (No. 1130); 2—2'0x6'8-1⅜ (No. 1130); 7—2'6x6'6-1¾ (No. 1130); 1—2'4x6'6-1⅜ (No. 1130); 1—2'0x6'6-1⅜ (No. 1130). **Jambs:** 1—2'6x6'8; 2—2'8x6'8; 2—2'0x6'8; 7—2'6x6'6; 1—2'4x6'6; 1—2'0x6'6; 2—4'0x6'8. **Interior Trim:** 3 sides single—8x10-3L; 1 side twin—8x10-3L; 2 sides single—10x12-16L; 5 sides single—10x12-12L; 1 side single—10x12-3L top; 10x14-3L bot.; 4 sides single—8x10-12L; 2 sides single—9x12-12L; 1 side single—8x10-16L; 2 sides louvre; 1 side dr.—3'0x6'8 with side lights; 1 side dr.—2'8x6'8; 1 side double door—opening 4'8x6'8; 1 astragal for 6'8 door; 1 side door trim 2'4x6'6; 2 side—2'6x6'8; 4 side—2'8x6'8; 4 side—2'0x6'8; 14 side—2'6x6'6; 2 side—2'4x6'6; 2 side—2'0x6'6; 4 side—4'0x6'8; 1 flight basement stairs; 1 flight main stairs with rail; 1 mantel shelf; 1—20" table; 1 drain board; 1—4'0 cupboard; 1—3'0 table; 1—3'6 cupboard; 1 nest of drawers; 1 scuttle door; 1 scuttle door jamb; 1 scuttle door trim; 1 medicine cabinet (No. 2835); 1 utility door; 1 utility door jamb; 1 side trim for utility door; 1 towel cabinet; 450 lin. ft. base; 450 lin. ft. base shoe; 450 lin. ft. base molding; 300 lin. ft. picture molding; 42 lin. ft. band molding; 24 lin. ft. closet shelving; 24 lin. ft. closet hook strip; 16 lin. ft. closet clothes rod; 108 lin. ft. ceiling cove; 14 lin. ft. threshold. **Note:** If living and dining room trim is changed, it will affect the following: 2 doors 2'4x6'8-1¾ french; 1 side trim 4'8x6'8; 1 door 3'0x6'8-1¾ (No. 1130); 2 sidelights, 1 side trim 3'0x6'8 with sidelights; 2 jambs 4'0x6'8; 8 side trim 4'0x6'8; 1 door 2'0x6'8-1¾ (No. 1130); 1 side trim 2'0x6'8; 1 flight main stairs with rail; 1 door 2'8x6'8-1⅜ (No. 1130); 1 jamb 2'8x6'8; 1 side trim 2'8x6'8; 2 side trim 10x12-16L; 3 side trim 10x12-12L; 90 lin. ft. base; 90 lin. ft. base shoe; 90 lin. ft. base molding; 110 lin. ft. picture molding; 108 lin. ft. ceiling cove; 1 mantel shelf; 558 ft. 13/16x1½ finish flooring.

TINWORK—140 sq. ft. tin deck; 32 lin. ft. ridge roll; 2 finials; 60 lin. ft. flashing tin; 2 screened vents; 80 lin. ft. gutter; 2 miters; 6 gutter ends; 3 nipples; 3 elbows; 3 offsets; 3 strainers; 3 shutoffs; 30 guttter hangers; 30 lin. ft. conductor pipe; 6 conductor hooks.

LINTELS—1 lintel for 3'0 door with sidelights; 1 lintel for 2'8 door; 1 lintel for 4'8 door; 4 lintels for 10x12-12L windows; 1 lintel for 10x12-6L windows; 2 lintels for 10x12-16L windows; 3 lintels for 8x10-3L-sash; 1 lintel for mullion 8x10-3L.

WEATHER STRIPS—5 sh. 8x10-3L; 2 wds. 10x12-16L; 5 wds. 10x12-12L; 1 wd. 10x12-3L top; 10x14-3L bottom; 4 wds. 8x10-12L; 2 wds. 9x12-12L; 1 wd. 8x10-16L; 1 door 3'0x6'8; 1 door 2'8x6'8; 2 door 2'4x6'8; 1 door 2'4x6'6.

CAULKING—20 single frames; 1 twin frame; 1 double door frame; 3 single door frames; 2 louvres; 1 coal chute.

INSULATION—3 rolls felt floors; 3 rolls felt roof; 4 rolls felt walls; 570 ft. ½-in. vegetable fibre or equal for ceiling; 1500 ft. ½-in. vegetable fibre or equal for walls.

HARDWARE—5 cellar sash sets; 15 sash locks; 15 sash lifts; 22 storm sash sets; 22 screen sets; 6 set shutter hardware for pairs; 1 front door set with butts; 1 rear door set with butts; 1 double door set with butts; 1 second floor rear set with butts; 3 single storm door sets with butts; 1 double storm door set with butts; 3 single screen door sets with butts; 1 double screen door set with butts; 1 floor hinge; 2 push plates; 13 inside locks sets with butts; 18 door bumpers; 4 doz. clothes hooks; 4 stair rail brackets; 1100 lb. assorted nails; 450 lb. sash weights; 3 hanks sash cord; 1 coal chute; 6 lb. brads; for medicine cabinet: 1 pr. ornamental butts, 1 cupboard turn; for towel cabinet: 1 cupboard turn, 1 pr. ornamental butts; for kitchen cabinet: 9 pr. ornamental butts, 6 cupboard turns, 3 elbow catches, 3 drawer pulls; for kitchen cabinet: 6 pr. ornamental butts, 4 cupboard turns, 2 elbow catches, 6 drawer pulls, 2 sets castors, 2 bin pulls; 1 drain board drawer pull; 4 friction stays—utility door; 6 drawer pulls for cabinet.

EXTERIOR PAINTING—4 gal. trim paint; 36 gal. shingle stain—roof; 18 gal. shingle stain—walls; 1 gal. porch floor; 1 gal. screen paint; 1 gal. sash paint; 1 gal. oil; 1 gal. turpentine; 10 lb. putty.

INTERIOR PAINTING—7 gal. white paint; 6 gal. enamel; 3 gal. filler stain; 2 gal. shellac; 4 gal. varnish; 2 gal. shellac, floors; 4 gal. floor varnish; 1 gal. oil; 1 gal. Japan; 1 gal. alcohol; 6 lb. putty; 1 doz. sheets assorted sandpaper; 3 pkg. steel wool.

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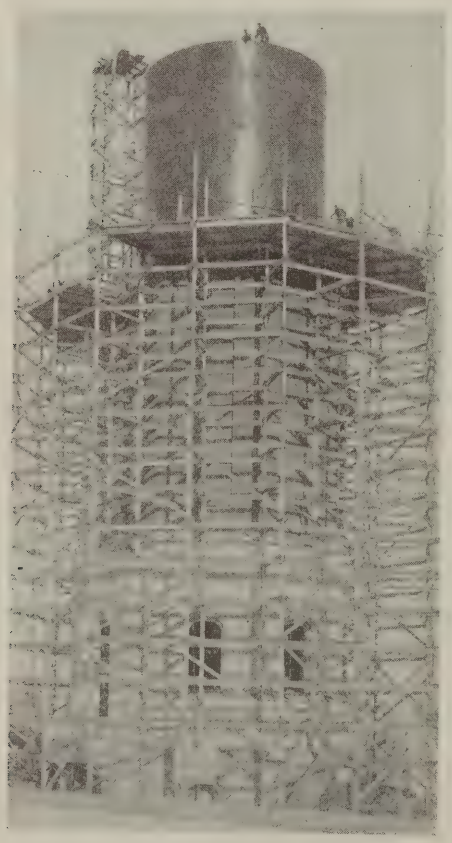
Basement plan and quantity survey for House No. 5A60, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.

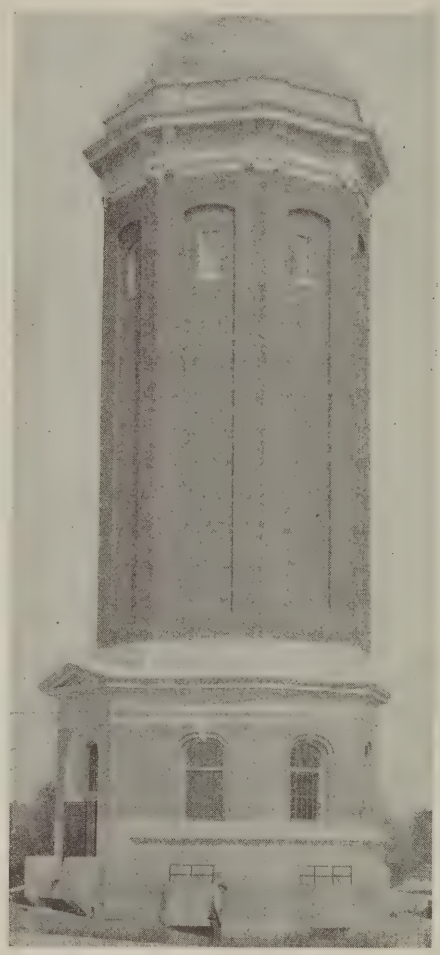
Water Tower and Pumping Plant

New Combination Water Tower and Pumping Plant at Manistique, Mich., Affords Good Example of Modern Trend in Water Supply Systems for Small Towns

EVERYONE is acquainted with the old-fashioned, unsightly, steel water tower that was found in small towns as a part of the water storage and supply system. The old style tank was generally nothing more or less than an ordinary steel cylinder, with little or no ornamentation, located on a hill or a high point from whence its unsightliness was apparent for a great distance. The design shown here is a new departure in waterworks construction and aside from the question of utility, is a good example of proper handling of a difficult architectural subject. According to the engineers, the original plant asked for was a steel storage tank with a separate brick building in which the pumping station was to be housed. After due consideration however, the design shown here, which provides for a single tower, with a pumping station in the lower part sealed off from a storage tank in the upper part, was decided upon, and it was found that the present design, which is far more effective architecturally than the original, was constructed at the same cost at which the first plan was estimated.



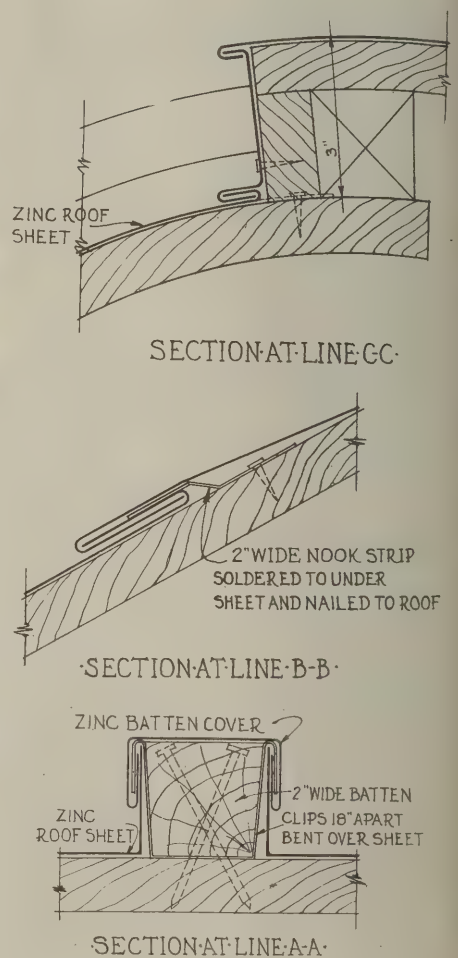
View of tower under construction, showing scaffolding and steel storage tank in place



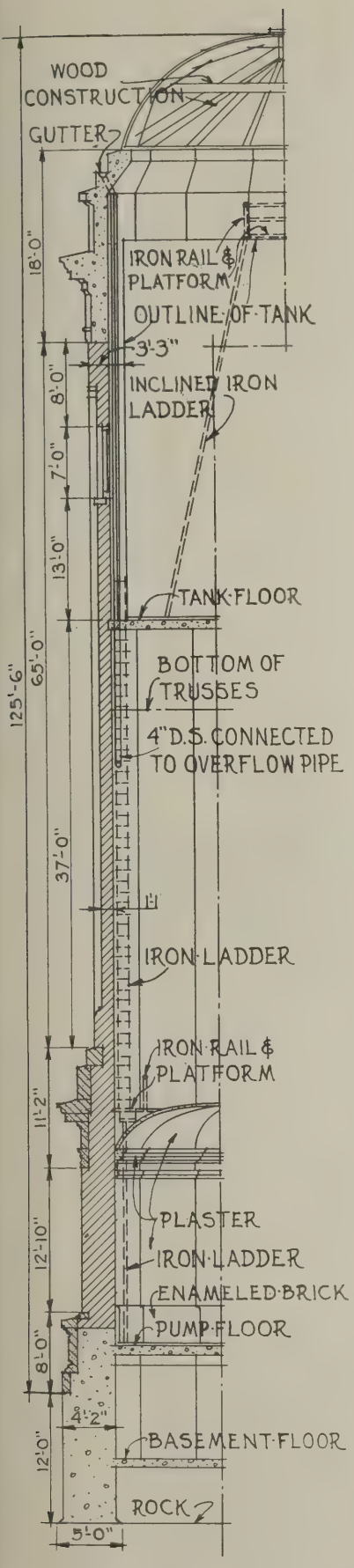
The completed tower

The structure is 137 ft. 6 in. high from the base of the foundation to the top of the stack and rests on solid rock. It is 38 ft. wide on the outside and 33 ft. wide inside. The outside wall is built octagonal in shape but the inside wall is made with sixteen sides in order to provide greater rigidity and heavier wall sections at the eight exterior corners upon which the entire load of the steel storage tank is carried. The foundation is concrete, the lower section of the tower brick with Bedford limestone trim, and the upper section brick with a concrete cornice cast in place. The roof is of wood construction, as shown in the detail, with a zinc covering.

In the basement are located the pump piping systems, the heating plant and coal room, and the employes' locker rooms and toilets. From the basement a circular iron ladder leads up to the pumping floor where the engines are located and an iron ladder leads from the pump room to the tank. The storage tank is 44 ft. high, 30 ft. in diameter and has a capacity of 200,000 gal. It is built of steel plates, with a spherical bottom, and is supported by eight short, fabricated steel legs, which transfer the load to the heavy brick walls. The Chicago Bridge and Iron Works had the contract for the steel work. The pumping equipment consists of three De Laval centrifugal pumps, two of which, driven by 60 hp. General Electric Co. motors are intended for constant use, and

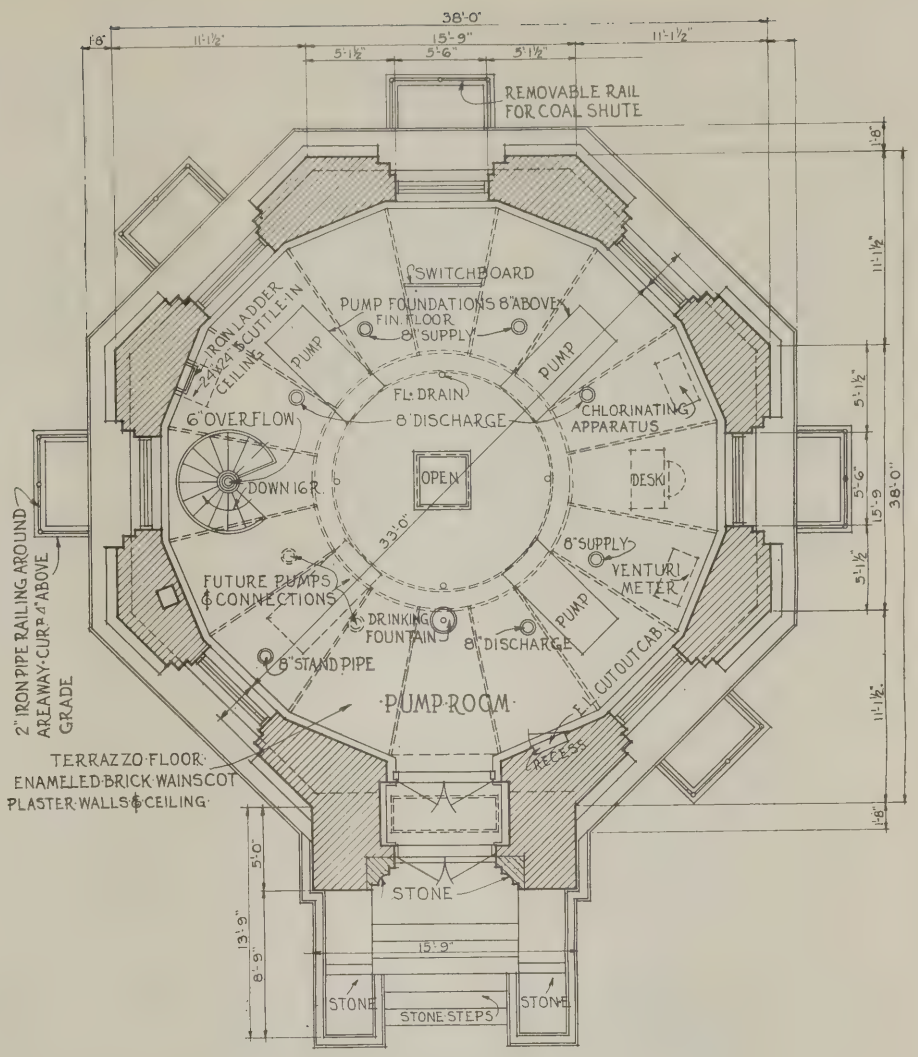

ZINC ROOF SHEET
SECTION AT LINE GC
2" WIDE NOOK STRIP SOLDERED TO UNDER SHEET AND NAILED TO ROOF
SECTION AT LINE B-B
ZINC BATTEN COVER
2" WIDE BATTEN
ZINC ROOF SHEET
CLIPS 18" APART BENT OVER SHEET
SECTION AT LINE A-A

Sheet-metal details for zinc roof covering, showing method of lapping



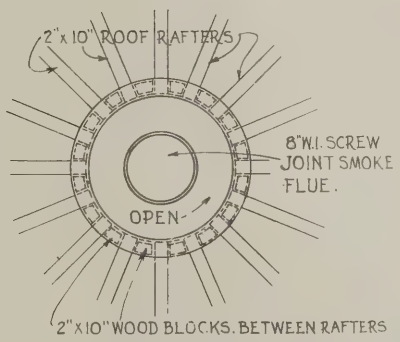
WALL SECTION

Vertical section through tower



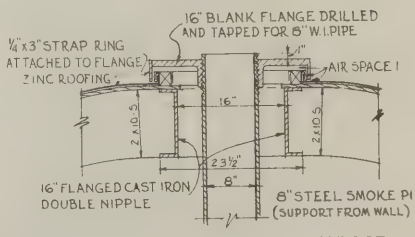
·PUMP·ROOM·PLAN·

Floor plan showing arrangement of mechanical equipment



PLAN·OF·ROOF·AT·SMOKE·FLUE·

Details of roof construction at stack

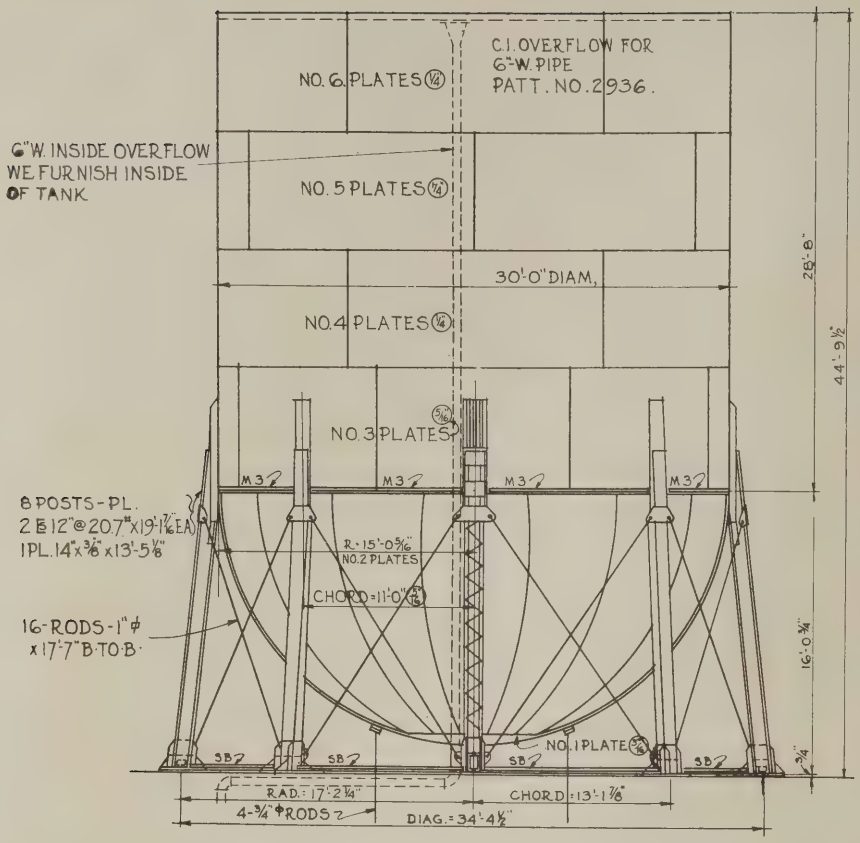


DETAIL OF SMOKE FLUE AT ROOF

Vertical section through roof

the third, operated by a 60 to 90 hp. Sterling gasoline engine was installed to operate the plant in the event of failure of either of the electrically driven units. The pumps are equipped with automatic float switches which shut off the motors when the water in the tank is high and start them when the level falls below a certain point. For measuring the daily water consumption a Simplex Venturi meter was installed and to provide pure water the plant is equipped with a Wallace & Tiernan Vacuum Type Chlorinating apparatus. Provision is made on the site for an adjoining filter plant to be installed when occasion demands.

A statement by the contractor indicates that 350 cu. yd. of concrete were used in the foundation and 210 cu. yd. were used in the ornamental top which is 18 ft. high, and has a cornice which projects 38 in. out from the wall. To complete the mason work, 341,000 brick and 3000 cu. ft. of Bedford stone were used, and all mason work had to be done from an out-


C.I. OVERFLOW FOR 6"W. PIPE PATT. NO. 2936.
NO. 6 PLATES
6"W. INSIDE OVERFLOW WE FURNISH INSIDE OF TANK
NO. 5 PLATES
30'-0" DIAM.
NO. 4 PLATES
NO. 3 PLATES
8 POSTS - PL. 2 ⊟ 12" @ 20.7# x 19'-1 7/16" EA 1 PL. 14" x 3/8" x 13'-5 1/8"
16 - RODS - 1" ϕ x 17'-7" B TO B
R = 15'-0 5/16" NO. 2 PLATES
CHORD = 11'-0"
NO. 1 PLATE
RAD. = 17'-2 1/4"
CHORD = 13'-1 7/8"
4 - 3/4" ϕ RODS
DIAG. = 34'-4 1/2"
28'-8"
44'-9 1/2"
16'-0 3/4"
M3
SB

Details of steel tank construction and framing

side scaffold as the space between the steel tank and the brick work was only 18 in. wide.

Alvord, Burdick & Howson were the designing engineers and the architectural design was by V. A. Matteson. Both are located in Chicago. The general contractor was Fridolf Danielson, a NATIONAL BUILDER subscriber, of Manistique, Mich., who finished the job without a single accident. Mr. Danielson's work should be an inspiration to local contractors in other parts of the country who are inclined to let such jobs as this go to big outside construction firms, because they are just a bit outside of the usual line of construction.

The cost of the completed tower was $100,000.

A Live Wire

L. H. K. writes: Wish to thank you very much for showing my letterhead in the April issue of your (Our) NATIONAL BUILDER. I am also carrying big signs on my jobs to let people know who is doing the work, and I can trace several jobs to this one item alone. And I am a strong believer in advertising if done in the proper way.

Other subscribers have commended the article referred to. What do *you* like best? Glad to hear from *you*.—Editor.

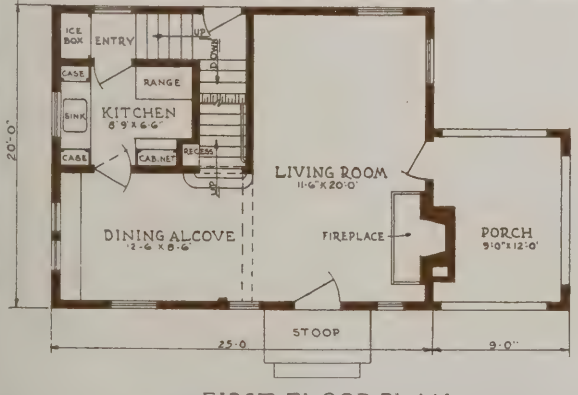
Interior view of pump room, showing electric and gas-driven centrifugal pumps, chlorinating apparatus, Venturi meter, and drinking fountain

National Builder
STYLE SHEET

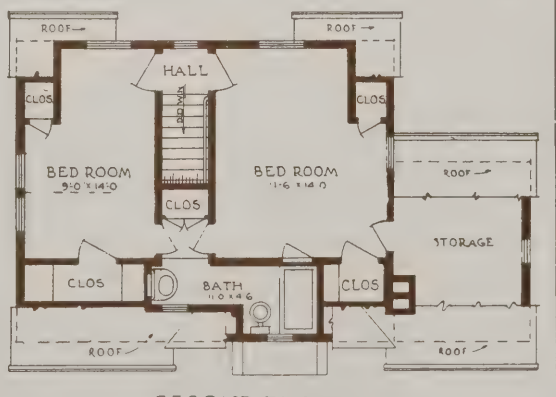
A Shingle-Covered House on a Wooded Lot in Des Moines, Iowa

The house that is most attractive is the one that seems to have grown from the soil where it stands. Messrs. Vorse, Kraetsch & Kraetsch, Architects, Des Moines, Iowa, have imparted that appearance to this little cottage which they designed for Mr. Leo Parrish, to be built on an attractive wooded lot in the Forest Dale addition to that city. The house is covered with shingles stained to harmonize with its rustic surroundings.

The plan is as good as the exterior, too. You come into a living room that runs across the entire depth of the house, and in one corner is the fireplace. Opposite the fireplace is the dining room, separated from the living room by only a plaster arch. The stairway takes up a minimum of room, for it is enclosed. The basement stairway occupies the same well and is reached from a grade entrance as well as the kitchen.



FIRST FLOOR PLAN



SECOND FLOOR PLAN

Two Charming Little Houses, With Excellent Plans, Built in Georgia and Louisiana

Mr. John C. Martin, Jr., of the firm of Hickman & Martin, Architects, Columbus, Georgia, designed and built this attractive little bungalow for his own home. He is another builder who believes in practicing what he preaches, and in this house he is certainly setting a good pace for the home owners in his community to follow. The half-timber work and the overhang of the attic are English in character and are not overdone. Note also the alternate narrow and wide courses in the shingles on the roof. There are four fireplaces in the house—they furnish all the heat necessary for the Georgia climate, but the plan can be altered, by the northern builder, for any other heating system. In addition to a large front porch, there is also a good sleeping porch in the rear, directly accessible from one of the bedrooms. Both bedrooms have fireplaces which share the flues that serve the living and dining rooms. The plan might be so arranged, if desired, to make accessible the space in the attic, where an emergency bedroom could be provided.

These Houses Contain Many Good Suggestions for Builders Everywhere

Yes, this little house is in Louisiana—Shreveport, to be exact—and not, as one might think, on Long Island. It is the home of Mr. J. C. Pridmore, and J. O. Mitchell was the architect. Like the house in Columbus, Georgia, on the opposite page, it contains many interesting features worthy of note by builders in every section of the country. The gentle, sweeping curve of the main roof down over the wide front porch adds much to the beauty of the design, and the shoulderless chimney appropriately balances the gable end of the dining room. Note the variegated colors in the wood shingles and the contrast with them made by the wide clapboards. The small panes in the casements preserve the scale of the design, and the little window in the gable, with the S-iron on the chimney, are ornamental details that add interest to the exterior. The interior is not, however, less attractive than the outside. There are five principal rooms on the main floor and two big bedrooms upstairs. Study the second floor layout carefully; you will see that there is a big open porch accessible from both these chambers. It can be screened in in summer or glazed in winter and used as a sleeping porch the year round.

FIRST FLOOR PLAN

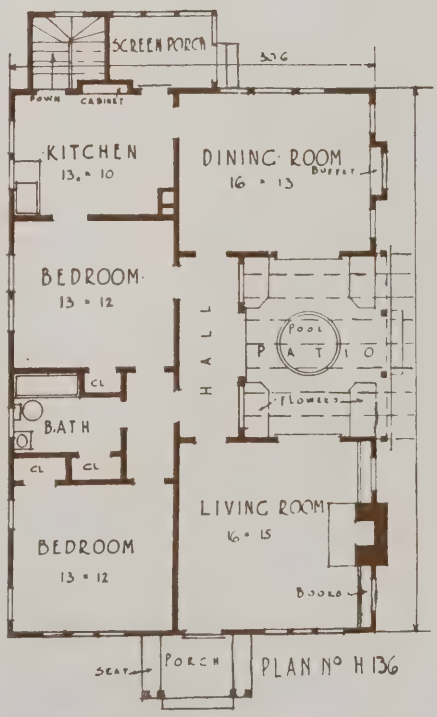
SECOND FLOOR PLAN

A House With Pergola Attached—A Suggestion for the Lot Without an Alley

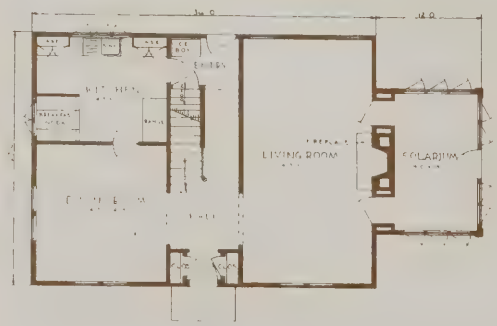
There are many lots on streets without alleys. Such lots, for the car owner, possess certain disadvantages, though there are autoists who prefer to drive into their garages from the street rather than from the alley. But what to do about the driveway is often a difficult problem. Builders confronted with this situation will find in this house and lot and the one on the next page, two successful solutions of the problem. Here the driveway is two narrow ribbons of concrete leading to the garage in the rear, and a pergola is employed as an ornamental feature to tie the house, drive and garage together as a unit. In this way a house thirty feet wide can be placed, with a driveway, on a lot as narrow as forty-five feet, as shown here. Notice one important thing about this house: the front living and bedrooms are under one roof, whose long side is toward the street, making the house seem wider than it really is and giving it a long, horizontal effect, which it would not have if the street end of the house were a gable. The plan allows not only a well lighted dining room, with a door opening onto the pergola, but also a large breakfast room. The sleeping portion is distinctly separated from the living rooms—giving each section more privacy.

A House With a Patio, Which Serves as a Porte-Cochere, for a Narrow Lot

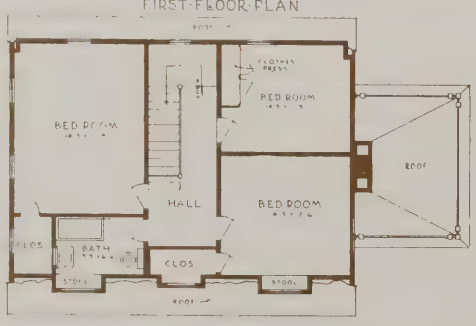
It may be impossible for the house on a narrow lot to have much of a flower garden, but there is nothing to prevent a little flower garden being grown right inside the house. This plan provides for a patio, which has a little pool or fountain in the center, and four flower beds along the sides. In addition to bringing the garden indoors, the patio also serves as a sort of porte-cochere, for it is directly on the driveway to the garage in the rear. It is accessible from both the living room and dining room and from the hall which connects these two rooms, and which makes it readily accessible from the bedrooms. Occupants of the living room and those seated in the dining room get a splendid view of the patio. Both of these rooms have cross-corner ventilation and light, which adds greatly to their comfortableness. A large closet in the bathroom is an unusual feature. Note the screened porch in the rear—a place for groceries and the ice-box, perhaps. The exterior owes much of its attractiveness to the fact that the house sets close to the ground, and the horizontal lines of the clapboards and wooden shingle roof preserve the low-lying effect. The entrance porch is a little large and heavy, but the general effect is good.



A Judicious Use of the Gambrel Roof and Colonial Details



FIRST-FLOOR PLAN



SECOND-FLOOR PLAN

This seems to be the age of gambrel roof houses. They are being built everywhere and in some sections are really overdone. But a gambrel roof house that is properly designed never tires, nor does it ever go out of style. Mr. W. L. Kraenert, architect, Des Moines, Iowa, has handled the gambrel roof in a judicious manner in this little five-room cottage. The use of Colonial details, such as blinds, the overdoor of the front entrance, the balustrade above the solarium and the quadrant windows in the attic gable, is very successful. The chimney is an important detail of the front of the house. At the time this picture was taken, steps had not been built up to the side entrance, and the house as originally planned did not provide for a front entrance at all nor for a door from the solarium to the outside, but these details can be easily provided for if they are desired. The Colonial stair has a hand rail volute and bullnose tread. The hall leads clear through the house.

Another Interesting Treatment of Wide Clapboards Painted White and Green Blinds—In Oklahoma City

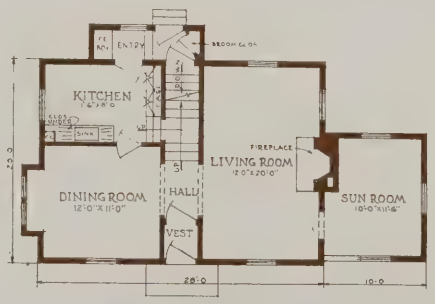
As the boys who went to France and who met soldiers from other parts of the world recall, one of the distinguishing characteristics of American small houses is the predominance of wood construction. When plain clapboards and blinds can produce the effect shown here, is there any wonder that wood houses continue to find favor? This little bungalow is in Oklahoma City and was designed by Maurice B. Jayne, architect.

Note the large arched louvres in the gables. They provide for the circulation of air beneath the roof and over the rooms, thus helping to keep the house cool in summer. The plan has a distinctly southern feature in the living room, which is situated in the middle of the house. Breezes can blow through the room, but the rooms on either side protect it from the heat of the sun by day.

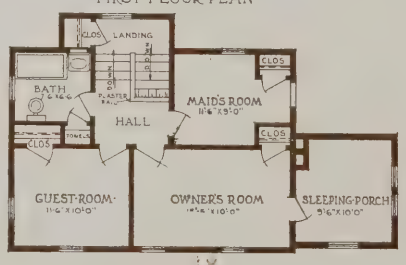
FLOOR PLAN

A Compact Plan with Sun Room and Sleeping Porch— in Duluth, Minnesota

LONG, wide halls, numerous large windows and open porches are not so well suited to the house in a section where the mercury drops pretty low in winter, and these features cost more than they are worth in the small house where every cubic inch must be made into livable space. Mr. Harold S. Starin, Architect, Duluth, Minnesota, has designed and planned this two-story house for a local client, and it is one of the most attractive homes in the northern metropolis. It is of the central hall type, but unusually compact in arrangement, and it has a sun room sleeping porch addition which looks as though it really belonged to the house instead of being a built-on after thought.



FIRST·FLOOR·PLAN



·SECOND·FLOOR·PLAN·

YOU enter the house through a vestibule, which helps keep the cold air out when the front door is opened, and hence to economize on coal bills. Straight ahead is the closed stairway, with a landing three steps up, from which you can go down to the kitchen. Thus one stairway serves as two. Entrance to the basement is direct from the outside through the rear entry, which contains the ice-box and a broom closet. Upstairs the owner's room is directly connected with the sleeping porch, and all the bedrooms are convenient to the bathroom.

Building Developments and Combinations of Materials

By Edward Stratton Holloway
Author of "The Practical Book of Furnishing the Small House and Apartment"

IN pursuance of the plan of affording valuable hints to the builder by the displaying of attractive examples of recent work (as mentioned in the first of the present series of articles) it was found that in the treating of certain building developments desirable combinations of materials were also supplied.

Fig. 1—Sunset Road, Reading, Pennsylvania

Fig. 2—Third Avenue, Reading, Pennsylvania

Combinations are valuable in the giving of contrast not only in color but in texture, so adding to the charm of even the simplest dwelling. Many of these, from clapboards and shingles to stone and brick, are constantly used; but others, either through the materials chosen or the manner of their employment, afford more individual results.

Sunset Road, Reading, Pennsylvania

Making attractive a row of small, low-priced houses is one of the most vexing problems confronting the builder. In the writer's opinion the difficulties have been well surmounted in this development (Fig. 1), occupying two blocks of the new Wyomissing Park section of Reading, Pennsylvania. These houses, with small porches and bricked terraces, with grass sown and trees, hedges, and shrubbery planted, are a building operation of the Wyomissing Development Company and sold for from $5000 to $6000 complete. (It has, however, been found necessary to increase the price of houses now being erected.)

The setting back of the houses is much greater than would be supposed from the perspective of the photograph, the distance from curb to house being 45 feet.

Both architecture and material are of the simplest, yet the result is good. The bricks—of deep reddish hue and rough texture—are relieved by the white wide mortar joints, the white woodwork and the white keystones and tablets. The triple windows and the door, with small lights, are excellent. At every sixth house there is a break in the row, giving side yards to the end houses, and it will be noted that in only the central two do the porches approach each other. The corner house has also a gated side porch of good di-

Fig. 3—Lantern Lane, Philadelphia. Spencer Roberts, Architect

Fig. 4—Lantern Lane, Philadelphia

mensions. The four-foot air chamber above the second story is given exteriorly the effect of an attic story by the molding below it, and it will readily be seen how greatly this adds to the appearance of the row.

As the ground slopes downward toward the back, these houses are three-story in the rear, with a full-sized triple window in the back of the basement. This basement is fitted with a large furnace with cold-air return, an independent water heater, stationary wash tub and toilet. Living room, dining room and kitchen occupy the first floor, and three bedrooms and a bathroom the second. The floors are stained, the walls attractively papered, the woodwork is white enamel and the doors mahoganized. Shades are supplied throughout. In the yard is a grape arbor of creosoted lumber. Completeness marks this whole development, even to the cleating of the porch posts for the training of vines.

Third Avenue, Reading

These houses (Fig. 2) are also desirable in their main features, but the fussy, slanting shingle roof is unnecessary and but detracts from the architectural appearance. The porches, too, are but conventional.

Lantern Lane, Philadelphia

This development is capable of supplying much inspiration to operators and builders. It was formerly a courtway or alley, with entirely negligible small two-story houses on both sides, and beyond its central location had nothing whatever to recommend it. Fig. 4 shows these houses in detail as they now stand, and Fig. 3 gives the general aspect of the settlement. As will be seen, the rough street has given way to attractive paving, with grass plots and shrubbery. The old side-and-back walls remain, but new fronts have been built in and the interiors entirely refinished, with hardwood floors and modern conveniences. As there is a central heating plant and janitor service, and as the property has been rendered private by its gateways, it is now considered a series of apartments. These very small houses at present bring a rental of over one hundred dollars a month.

The details are well worth consideration, from the hanging sign on the outer wall, giving the name of the street, through the simple but attractive gateway of brick and iron, with its lanterns or its rear gate surmounted by a trellis, to the finish of the houses themselves. The walls are of stucco, the sills of rough brick laid upright, and the woodwork is extremely chaste in design. The doors are in various colors, each pair harmonizing in hue —for instance, one door is in deep yellow and its neighbor in apple green, while the next pair is of red and somewhat greyed but still strong blue. An iron lantern and small tile inset are at the side of each doorway. The varied treatments of the second-story windows and the upper facades will be noted. Simple but attractive passages with cement walks give access to the back entrances of these houses.

251 and 253 South 17th Street, Philadelphia

This pair of three-story larger houses (Fig. 5) is another instance of judicious remodeling, and presents a most attractive use of combined materials, giving a rich and colorful effect through the use of tones, nevertheless quiet in themselves. The walls are here also of stucco. The relieving brickwork is laid both horizontally and upright. The columns are of warm gray stone, the arches being tied with an iron rod in the Italian manner. The tile inset over the doorway is of a ship of bygone days, this and those above the windows being of dull tones in which blue, red, and green prevail. The inner panels of the window boxes and the window sashes are of cream, while the trim of the boxes and the remaining woodwork are of bluish slate color. The roof is of tile, and both here and in the Lantern Lane development the heads to the water conductors are of simple but excellent design. The lower story of one of these houses is used as an office and the remainder of the property as apartments.

In some other houses, not far distant, now being remodeled, the stucco fronts are of the utmost simplicity but are rendered attractive by very large second-story windows (two double casements) the sash of which, with the other woodwork, is painted an apple green. Next door to these the door frame is of black marble or slate, giving an excellent contrast to the light stucco front.

House in Fig. 1 in July National Builder

So charming was the country house pictured in Fig. 1 of the article in the July issue that it has been thought well to include here a delightful view (Fig. 6) showing in greater detail its combination of materials and its bricked terrace with surrounding hedge.

Such examples as these will, without their being copied, afford many ideas as to arrangement, architecture, and the happy use of materials. The next article will suggest some unusual interior treatments.

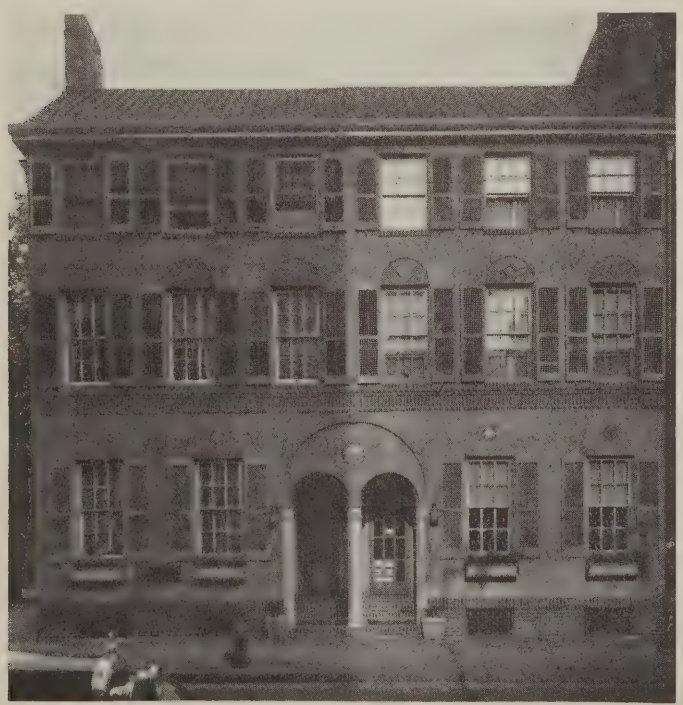


Fig. 5—251 and 253 South Seventeenth Street, Philadelphia

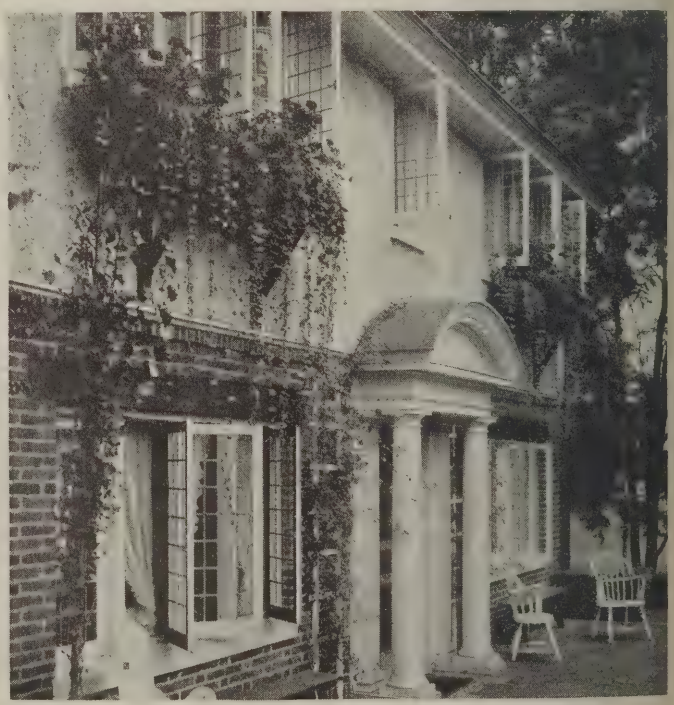


Fig. 6—House in Fig. 1 in the July National Builder

The Cost of Each Job

Application of Material, Labor and Expense to the Construction of Buildings

By G. W. Hafner

WHILE a great deal of thought has been given to cost finding in manufacturing plants and mercantile establishments, the subject has been slighted by contractors. The methods of accounting used by building contractors are among the poorest, yet the volume of work done places building among the foremost enterprises of the country. Many of the largest, and perhaps the majority of smaller concerns, make up their estimates, submit their bids and finish construction work without any sort of accurate knowledge of conditions and costs.

Why Keeping Costs Is Necessary

This lack is due partly to the fact that the heads of contracting concerns have, usually, come up through the operating side of the business and, naturally, the "book" side has not been sufficiently studied to be properly emphasized. Some of these contractors have confided to the author that they know little or nothing of bookkeeping and cost finding; that it costs too much to get at the figures; that the majority of the recommendations made cannot be carried out; or that many of the proposed systems, or system now installed, do not meet the requirements of the business. To them costs on construction work generally conjure up visions of impossibilities, built on the elaborations of theorists. Many of them will say, "The idea may be all right, but it is not practical in my business."

Nevertheless, without systematic cost records of some sort, the building contractor can have no real measure of the actual cost of a given job. Of course, he can "guess" and "approximate," but he cannot *know*. Sooner or later he will find it necessary to keep costs for the following reasons:

1. To furnish a record for observing the progress being made on a building.
2. To prevent a loss on any one section, due to ignorance of facts.
3. To record such salient facts as will be necessary for future reference.
4. To govern prices in the making up of future estimates.
5. To insure a satisfactory profit.

Requisite of Good System

The first requisite of any proper cost system for contractors is to "break up" the various classes of charges to the building, so that material, labor and other divisions of the building investment may be shown at a glance.

For this reason, costs should be kept for each section of the construction work, such divisions or sections, at least, as Excavation, Concrete, Carpentry, Masonry and Ironwork. If the individual contractor wishes to go into finer detail, he will, of course, subdivide each of these main sections into the particular kind or class of work performed in each. For instance, in the Carpentry division, he might have such subclassifications as

(a) Pier and Footing Forms
(b) Wall Forms
(c) Column, Beam and Floor Forms
(d) Stair Forms
(e) Floor Sleepers
(f) Set Door Forms
(g) Set Window Frames
(h) Steel Sash
(i) Rough Floors
(j) Finish Floors, etc., etc.

classification of labor falling within the given section, and entry would be made to these columns, daily, directly from the Daily Time Report, illustrated by Fig. 30 in the preceding article (May, 1923, page 52).

If it is not desired to keep costs in such fine detail, the various columns of the Labor Summary are headed with the main sections, as Excavation, Concrete, Carpentry, etc., and entry is made daily to each of these columns, from the Daily Time Report, as in the former case.

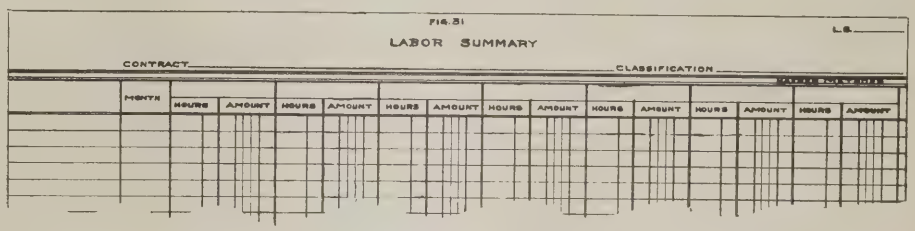


Fig. 31—This form provides for analyzing the labor on each job

Generally speaking, it is not necessary to require workmen in keeping the Daily Time Reports, to classify the time down to the last minute, as this is impractical for the average building workmen. A little "give and take" will induce the men to co-operate better than if they are held strictly to the minute. A fairly accurate division of the day's work will be found sufficient.

Some workmen cannot write well, and many foreigners are often employed who cannot read or write English. For such workmen the Daily Time Reports will be made out by the superintendent or timekeeper.

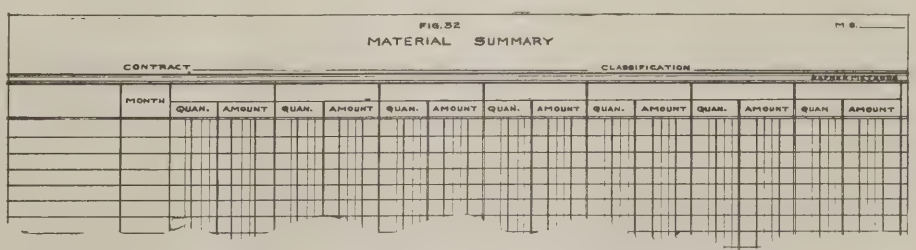


Fig. 32—This form provides for keeping track of the material entering into each job

Labor Summary

Provision is made for thus analyzing the labor on each job by the use of the Labor Summary (Fig. 31). In case the contractor wishes to subclassify his labor as shown above, one or more of these sheets would be maintained for each of the main sections of the work, such as Excavating, Concrete and so on. Each of the double columns showing hours and amounts would be headed with a particular sub-

Material Summary

The material entering into each job must also be known and recorded, for which purpose the Material Summary (Fig. 32) is provided. The principle governing the heading of the various columns is the same as for the Labor Summary.

Entry to this record is made from two sources. The first source is that of the Purchase Analysis (Figs. 7 and 7A published in a preceding article). As previously explained in the article covering "Purchase Methods and Records," where material is purchased for some particular job, the entry is made to the Purchase Analysis in the columns headed "Direct Charges," under which the name of the job, the account number, the quantity and amount of the invoice are all to be shown.

These various entries are then posted to the specific column of the particular Material Summary sheet to which they apply. This posting, of course, may be made directly from the purchase invoices themselves, but it is considered better practice to post them from the Purchase Analysis, because thereby assurance is had that all postings are made.

Cost Sheets

In whatever form cost data are gathered, they must be entered on a form that will show the entire cost of a given job—hence, the Cost Sheet (Fig. 33).

At the end of each month, all the columns of the Material Summary are totaled, and these totals are posted to the "Material" columns of the cost sheet bearing the same contract name or number as that showing on the particular Material Summary sheet from which the posting was made.

When all the columns of the Labor Summary are totaled at the end of the month, these totals (hours and amount of each case) are posted to the "Labor" columns of the Cost Sheet. Hence, we have posted to the particular cost sheet a certain number of hours and a certain amount of labor for each of a number of subclassifications.

In case costs are kept in finer detail than by the main sections of the work, it will be found advisable to maintain one cost sheet for each and every section of each job.

The "Department Overhead" is next added. This consists of all expenses directly chargeable to departments or sections of construction work; and, if such expenses are analyzed by particular jobs when they are taken into account, it is an easy matter to apply the total against the various subclassifications (in case costs are kept in fine detail) by dividing the total department or section labor into the total department expense, to find the "Expense Rate" and then multiplying this by the labor shown for each specific subclassification.

The direct overhead, as explained in the article dealing with "Expense Distribution," is posted to the "Direct Overhead" columns.

There is still a considerable amount of expense, which cannot be tied up directly with any given job or jobs, to be posted to the Cost Sheets. This is provided for by the two columns headed respectively, "Prorated Overhead" and "Administrative Overhead."

To apply "Prorated Overhead" to the costs it is necessary to determine the "Expense Rate." This is accomplished by dividing the total labor used on the various jobs for the month into the total amount of prorated overhead expense for the like month. This expense will then be applied to each item by multiplying the amount of labor by the expense rate.

"Administrative Overhead" is applied to the costs by multiplying the total of the "Material," "Labor," "Direct Overhead," "Department Overhead," and "Prorated Overhead" columns by the "Expense Rate" worked out for "Administrative Overhead." This is found by dividing the total cost of all jobs up to this point into the total of the "Administrative and General Office" expenses.

One or more cost sheets, as required, should be kept monthly for each job, or for each section of each job. When all postings are made for the particular month, the various columns are totaled, and these totals are transferred to new cost sheets for the succeeding month.

Keeping the cost of each job in the way indicated above enables the proprietor or superintendent to watch the progress being made on each section of the building, and provides all the information necessary in guiding the operations. It may also eliminate a loss which would otherwise not be discovered until it was irreparable.

FIG. 33

COST SHEET, MONTH OF _____ C.S. _____

CONTRACT _____ DATE STARTED _____ DATE COMPLETED _____ CLASSIFICATION _____

HAFNER METHODS

MATERIAL				LABOR				DEPARTMENT OVERHEAD		DIRECT OVERHEAD		PRORATED OVERHEAD		ADMINISTRATIVE OVERHEAD		TOTAL
DESCRIPTION	ACCT. NO.	QUAN.	AMOUNT	DESCRIPTION	ACCT. NO.	QUAN.	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	RATE	AMOUNT	AMOUNT

Fig. 33—Form which shows the entire cost of a given job

Comparative Cost Record

The estimate of the cost of a building should be used as a measure of comparison with the *actual* cost of the same building. If the comparitive Cost Record (Fig. 34) is used, this is accomplished to advantage.

Each item of the estimate is set down, *showing* the estimated quantities, estimated unit cost and estimated total cost. Opposite these estimated items are shown actual quantities, actual unit cost and actual total cost. By this means the gain or loss on the estimate for each item, to as detailed a classification as is desired, may be arrived at.

Carrying this idea through all the items that go into the construction of a building, it is seen that the contractor may *know* what each particular item "earned" or "lost" for him. It is not enough to know that a profit was made on a certain job. A large profit may have been made on a few items, while other items were estimated too low.

With a system such as is outlined above the contractor has a complete grasp of his business, and can control it on a basis of accurate knowledge. Cost keeping is not a fad; it is a necessity. It has been applied with a large measure of success to manufacturing plants and to mercantile establishments. It is now being successfully applied to construction.

FIG. 34

COMPARATIVE COST RECORD C.C. _____

CONTRACT _____ DATE STARTED _____ DATE COMPLETED _____ CLASSIFICATION _____

HAFNER METHODS

ITEM	ACCOUNT NUMBER	ESTIMATED QUAN.		EST. UNIT COST	ESTIMATED TOTAL COST	ACTUAL QUAN.		ACTUAL UNIT COST	ACTUAL TOTAL COST	GAIN ON ESTIMATE			UNIT GAIN ON EST.	LOSS ON ESTIMATE			UNIT LOSS ON EST.
		QUAN.	UNIT			QUAN.	UNIT			QUAN.	UNIT	AMOUNT		QUAN.	UNIT	AMOUNT	

Fig. 34—A comparative cost record like this is useful as a measure of the estimated cost of a job

Paint as an Aid to Renting and Selling

6. Popular Stain Effects as Applied to Particular Woods

By Albert Brace

BIRCH is a hard, close-grained wood that takes stains very well and requires no paste filler. Its markings are variable, but straight grained is satisfactory for all ordinary trim, reserving the selected figure for door panels and casings. The soft sapwood gives a dark effect with oil stains, so for the strictest uniformity a water stain is necessary.

Birch is usually stained to imitate red or brown mahogany or walnut, although it is also possible to finish it in such oak colors as mission brown, fumed, grey-green, etc. When stained to imitate red mahognay the idea is usually to produce a Colonial effect as exemplified on a staircase by red stain on handrails and treads with white enamel on the risers and spindles. The effect is singularly rich and the stain in this case should be a deep red, rather than a rich red or brown, finished off with a coat of shellac and eggshell varnish.

To imitate brown mahogany, an oil stain is satisfactory, but of a deeper shade than would be proper for gum for the reason that birch has a naturally reddish hue which must be subdued. The same is true of the strength of stain necessary to produce a good walnut color—a somewhat deeper color of brown is requisite than for gum. In any case the stain should be lightly wiped to insure the greatest possible uniformity and clearness of tone after it has dried a little. Follow with a coat of orange shellac and for mahogany finish off with one or more coats of flat varnish; for walnut either flat varnish or an application of wax. To gain a very smooth effect it is often desirable to rub down the shellac with fine steel wool.

Gum, referred to variously as red gum or sap gum, may be finished to resemble walnut so closely that it would be difficult for any but an expert to tell the difference. A strong stain is not necessary, one of the oil variety is satisfactory, as the wood has a rich natural color of its own and, being close grained, it requires, of course, no filler. Like birch, it is variable as to figure, some of it being so beautiful as to offer an excellent imitation of Circassian walnut. In this case a very weak water stain is used in order to bring out the fine texture and elaborate markings to the full.

Straight grained gum is customarily employed for ordinary standing trim and may be finished to resemble red and brown mahogany almost as closely as walnut. The light colored sap wood takes the oil stains very dark and for a uniform effect where such stains are employed it is best to touch it up previously with a very thin water stain. Gum absorbs moisture very readily and for this reason it is often desirable to prime it on the back with lead and oil prior to installation. This prevents it from being warped by contact with wet plaster.

After being stained it is customary to finish gum, regardless of the stain color, with a coat of shellac and a coat of wax

Soft pine beamed ceiling done to match window casing in mellow brown stain and wax

or one or more of flat varnish for the reason that its greatest beauty is brought out in dull, satin-like effects.

Oak is not so popular an interior trim wood as in past years, the increased cost being the chief objection, though it has also slumped in favor, due to the change in furniture styles. There was a time in English history when oak was not only the principle furniture wood but whole rooms were paneled with it—it's massive beams supporting the ceiling as well. Hence we have such period names for various oak finishes as Baronial, Old English, Early English, Jacobean, Smoked, etc.

There are probably more stained effects possible with oak than with any other single wood ranging all the way from Gothic, Flemish, Italian and the English period finishes enumerated above, to the more modern golden, fumed, mission, antique, not to mention a variety of novelty effects rendered possible through the fact that the wood's open grain may be filled in contrasting colors. It might be useful in this connection to list the different oak finishes with notes as to the proper treatment.

The following should be produced without a filler and be finished with shellac and wax:

Name	Color
Baronial	Deep Brown
Jacobean	Yellow-Brown
Smoked	Black
Weathered	Blackish Green
Gothic	Medium Brown
Fumed	Various Browns
Flemish	Black or Brown
Mission	Rich Brown
Flanders	Reddish Brown

The following call for a paste wood filler, shellac and varnish:

Name	Filler
Golden	Golden Oak
Antique	Black
Old English	Antique
Forest Green	Black
Light Oak	Natural
Early English	Black

The following are chiefly novelty effects and are finished in shellac and wax:

Name	Filler
Silver Gray	White
Hungarian Oak	White
Italian Oak	Gray Wax
Frosted Oak	Gray Wax
Green Stains	Gold
Gray Stain	Aluminum

Almost all of the above are satisfactorily treated with oil stains. The exceptions are silver gray, which calls for an acid stain to give the required, even, clear tone, and forest green, which is best colored with a water stain, though no brilliant green stain, aniline or otherwise, has yet been developed which will resist the fading tendencies of light. For Italian and frosted oak an acid stain also is best as an oil stain would darken the pores unduly, whereas on smoked oak a spirit stain is satisfactory, being brilliant and quickly applied. Oak is never stained in red mahogany.

Finish for Other Woods

Oregon pine (or Douglas fir) and *cypress* have very pronounced markings that are difficult to tone down even by applying the stain rather strong. They require no filler and are best finished in antique mahogany, dark oak or walnut colors; an oil stain should always be used, never an acid stain, as the water raises the grain to a very radical degree. *Georgia pine* is a treacherous wood to stain as it contains pitch and resin-

ous oils which cause any stain to take very spotty—dark in one place and light in others. It represents one instance of where a pigment stain would be preferable as by covering the surface it is likely to give a more even tone. A good finish color for it is weathered oak.

Beach and *butternut* are best treated in imitation of walnut, an acid stain being preferable to the oil type, whereas *ash* and *elm* take oak finishes best and are usually finished with the oil stains appropriate to that wood. The same is true of *chestnut* and all three being open grained require a paste filler. *Redwood,* largely used on the Pacific Coast, has so strong a natural color of its own that it is usually varnished natural, depending to some extent on whether it is burl, edge grain or slash grain. In the same region there is a popular effect on *yellow pine* called "driftwood," a gray stain giving the appearance suggested by the name.

Hardwood Paneling

It will be noted that nothing has been said heretofore regarding mahogany and walnut except to say that as interior trim they are confined largely to paneled living and dining rooms in fine residences Yet there are signs today that even in lower-priced construction there is going to be a demand for at least one room so equipped. Much depends, of course, on the veneer market, but it cannot be gainsaid that for richness of effect it would be difficult to duplicate a mahogany or walnut wainscot in the dining room, a similar fireplace in a living room or a library entirely so paneled.

The work has got down to a very fine point in recent years, due largely to the progressiveness of the veneer people and the several hardwood trade associations. The panels and sheets are blind nailed and the figured effects are of a beauty difficult to exaggerate. As a means of reducing expense in this direction, the possibilities of gum are worth looking into—in any case, the finishing possibilities are a delight. A brown mahogany or soft brown walnut water stain (not too dark), glazed, shellacked, varnished and rubbed dull would give an alluring richness that should add considerably to the selling value of the whole.

Enameled and Painted Woodwork

While indications point to a lessening in the popularity of painted and enameled trim as against the stain treatment, nevertheless viewed from the practical viewpoint there are certain woods which could not look well finished in any other manner. These are, briefly, poplar, poor runs of hard or yellow pine and shortleaf or soft pine. Woods which may be stained but also offer a good foundation for paint or enamel are birch, gum, basswood, white pine, butternut, cypress, poplar, hard pine and Douglas fir. Hemlock and cottonwood are bad woods for the purpose.

Enameled trim may consist of two, three, four or five coats, according to the quality of finish desired. The choice of colors is by custom somewhat limited. White is being more and more abandoned, due, first, to the glare and, secondly, to the tendency of even the best products to turn yellow where not exposed to a measurable degree of light. Ivory is the most popular color, followed by cream, gray, green and light blue, in the order named.

The most important item in workmanship is the care given to preparing the surface and the smoothness of the undercoats. After thoroughly sanding the wood all knots and sap streaks should be given a thin coat of orange shellac. While some prefer lead and oil undercoats, the writer believes that the manufacturer's special product is superior despite the greater first cost. Brush marks are obviated, and quicker drying makes for speedier work at no sacrifice in wear. After the first coat has been applied (somewhat reduced) putty all nail holes and cracks flush with the surface.

A second and third coat of undercoater should follow, the latter mixed with a little of the enamel, especially if a tint rather than white is desired. The fourth coat should be the enamel reduced a little with turpentine, and the fifth coat should be composed of the enamel as it comes from the container. All coats must be carefully sandpapered with double O sandpaper before the next one is applied, and the final coat, unless it is so prepared to dry that way, may be rubbed down to an eggshell lustre with pumice stone and oil or else left in the gloss. The semi-gloss effects are most popular and a novelty, antique twist may be produced by working burnt umber in oil into the deep parts of the molding, to be wiped while still wet.

Curiously enough, a high priced trim enamel is often cheaper than one obtainable at half the price. This paradox is explained by the fact that the chief cost of painting lies in the labor involved. If an enamel is so stiff that the painter has a hard time brushing it out, or if it runs and sags so that he has to go back over it, everything saved on the purchase price will be more than wasted in retarded work. The higher priced, nationally known and advertised enamels flow out smoothly, level themselves up automatically behind the brush and with the passing years mellow rather than crack and peel.

Painted woodwork is possible in an attractive way without the drawback of brush marks by using ordinary flat wall paint, at least two coats, and interesting combinations can be brought about with a lighter or darker tint on the walls themselves. A very agreeable novelty effect for certain rooms is possible by putting a gray ground color on the wood, followed by a distemper color, grained the length of the wood in slightly wavy lines. This is followed by a coat of starch or white shellac and wax. The whole is restful, inexpensive and easily kept clean.

A combination of white enamel and mahogany imparts a Colonial feeling to a stairway

Rebuilding Belgium

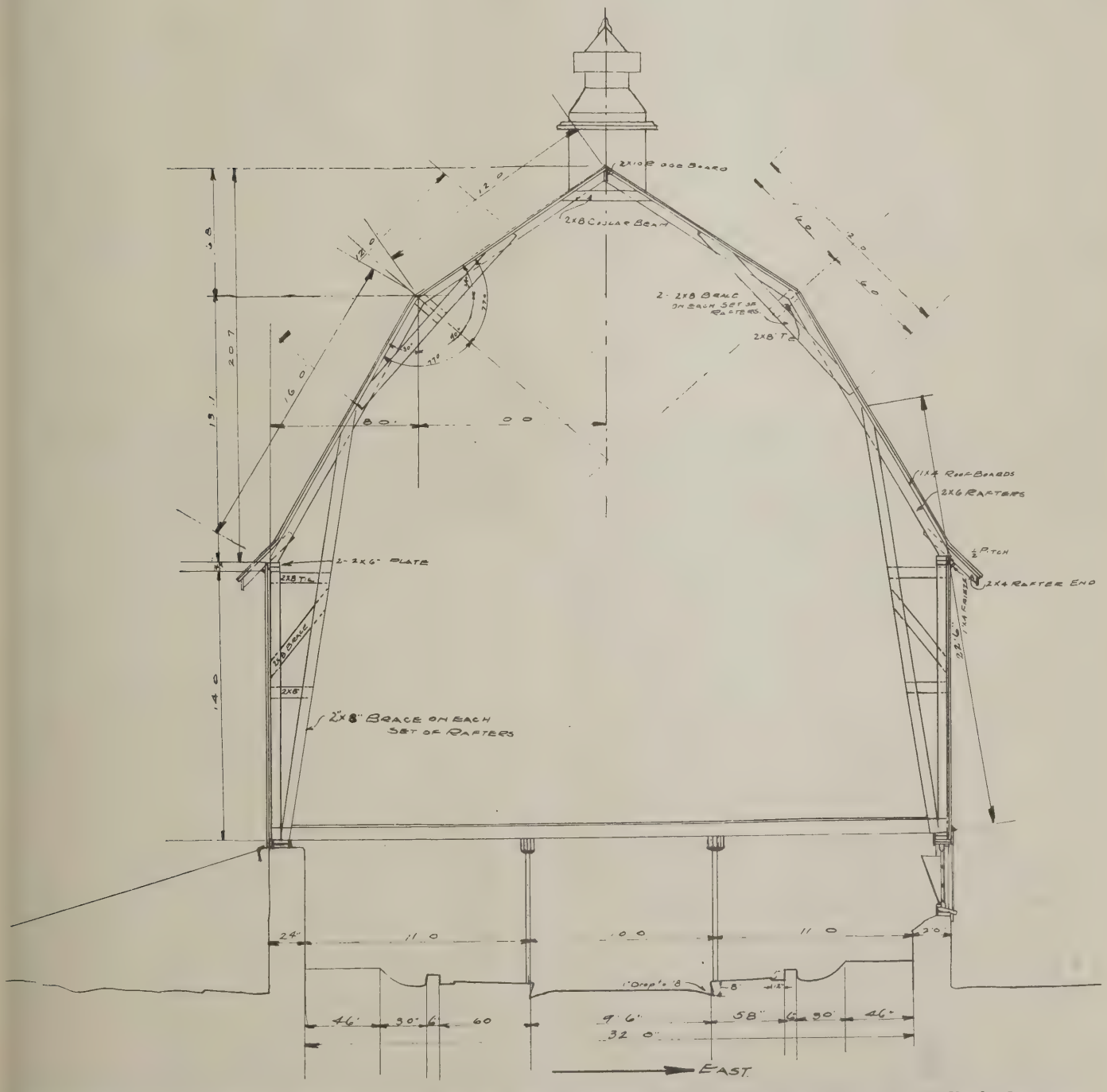
A Belgian government report gives particulars of the progress that has been made in restoring the cities and villages laid waste during the war. It is a record of strenuous and successful effort carried out without any help from the still uncollected German reparations fund. Since the armistice 74,585 houses have been rebuilt or restored. Ypres and Dixmude are the two towns where the destruction was most complete, and the rebuilding has accordingly been most striking. In both these towns every house was destroyed. Now about half of them have been rebuilt, as well as many public buildings. Throughout the country 779 public buildings, out of more than 1200 destroyed, have been rebuilt. With the provision of houses has come a re-peopling of devastated territory; the census shows how the exiled population is steadily returning. —*The Illustrated Carpenter and Builder (London).*

Wisconsin Dairy Barn

Modern Structure in a Great Dairy Region

WISCONSIN is one of the greatest dairy sections of the United States. Its dairy farmers are prosperous and progressive. The structures they have to house their stock are generally the most modern to be had. An example of one of these is shown herewith. This barn was completed last summer for Beaver Bay Stock Farms, R. F. Clark, proprietor, at Beaver Dam, Wis., by W. W. Koch, contractor of Beaver Dam. The plans were made by the F. Rasmann Manufacturing Company, also of Beaver Dam, who furnished the equipment. The total cost was approximately $11,000. The contractor worked on a percentage basis.

The barn is 36x120 feet, timber construction, with a concrete foundation and basement floor. A detail of the truss construction is shown in the accompanying illustration.



Cross section of barn on Beaver Bay Stock Farms, Beaver Dam, Wisconsin. R. F. Clark, Proprietor; W. W. Koch, Contractor

A huge sign on the end of the barn advertises the owner's specialties

An interior view, showing cow stanchions and overhead track for manure carrier

Another view showing the ramp leading to the hay mow

Two silos are built directly in connection with the barn, at one end

On the Job with the

. . . . Minnesota . . . .

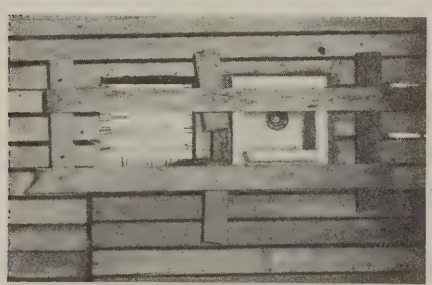
Scaffold Bracket

HERE is another scaffold bracket, used by H. Van Horn, of Duluth, Minn. It is built of 1x6, the horizontal member being nailed directly to the stud and the diagonal brace nailed to the horizontal member and toe-nailed to the sheathing. Notice that a cleat is nailed to the horizontal member on the side opposite the brace so as to provide a good nailing base.

Scaffold brackets in place at corner of building

Fixing a Soap Dish in a Partition

IT is sometimes difficult to provide a good setting for a built-in soap dish. The method shown here is used by Bowman and Newton, of Duluth, Minnesota.



Soap dish in unfinished partition

On the job with F. M. Leach, a builder of Des Moines, Iowa

The opening for the soap dish is framed with 2x4s and small nails are driven in the 2x4s as shown in order to hold the cement.

The opening is filled with cement and the soap dish set and held in place by two laths as shown in the illustration.

View of narrow gauge excavators' railway

Precast Concrete Footing

HERE is an illustration showing a precast concrete footing which may be cast in the yard, during the workman's spare time and delivered to the job as needed.

Precast concrete footing under timber columns

By the use of this precast footing, it is not necessary to bring concrete into the excavation in buckets to form the footing, or to build a scaffold so that a wheelbarrow may be brought to the footing location and dumped.

This photograph was taken on a job being done by James Falconer, of Duluth, Minnesota.

Engineering Methods Applied to Small Building Construction

INSTEAD of wheeling or scraping dirt from the rear of a building to the front, this Duluth, Minnesota, contractor, who had considerable grading to do, used a low, narrow-gauge dump car. This is a good instance of how one man kept a piece of equipment working which may otherwise have been standing idle, for its use on small building work is seldom seen.

Construction Editor

. . Kentucky and Alabama . .

A Concrete-Form Kink

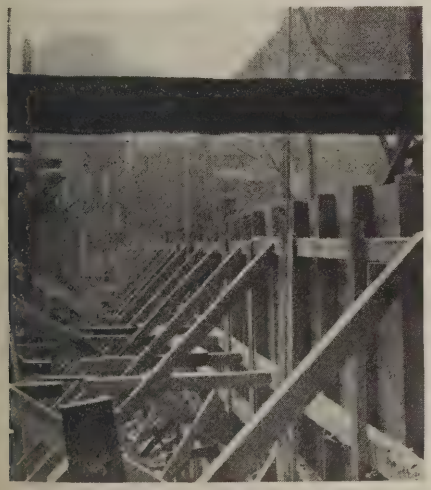
IN the example illustrated it was required to pour a concrete porch floor on a porch supported by concrete blocks. As a quick and easy way of holding the side firm the builder simply drove wedges into the holes

View of porch

in the concrete blocks and nailed a piece of board to them. This "kink" was used on two small houses by Otis & Bruce of Louisville, Ky.

Strengthen Form Bracing

TO provide greater strength for their foundation forms, the Morris Construction Company, general contractors, of Montgomery, Alabama, used the method shown in the

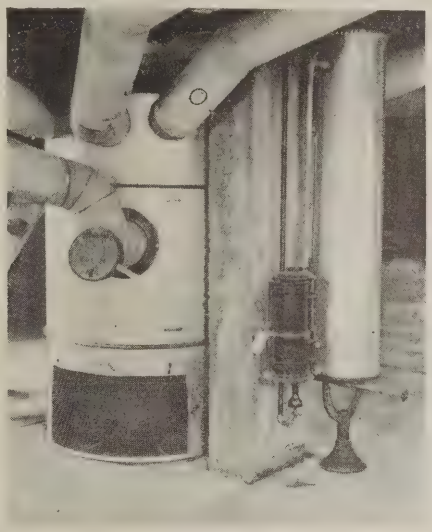


Notched form bracing

accompanying illustration of notching the braces where they bear against the form ribbon, the brace bearing upward and outward.

A Study in Compactness

HERE is how a Louisville, Kentucky, contractor arranged his heating units around a basement pier and so instead of

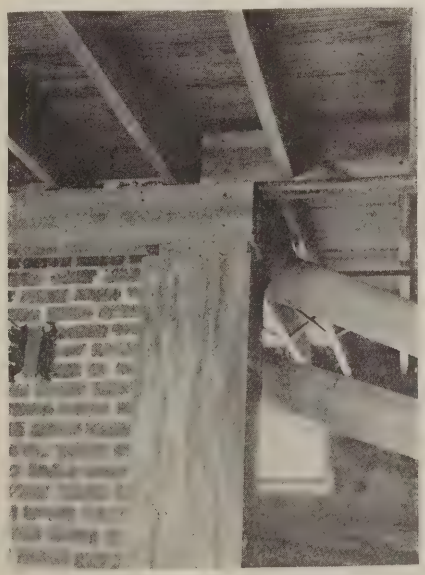


View showing grouping of heating units

obstructing the basement at several different points, placed all his heating apparatus in one location, thus leaving the rest of the basement clear.

Method of Providing Additional Head Room in a Basement

IN the construction of a large number of buildings at Louisville, Ky., by the J. & J.



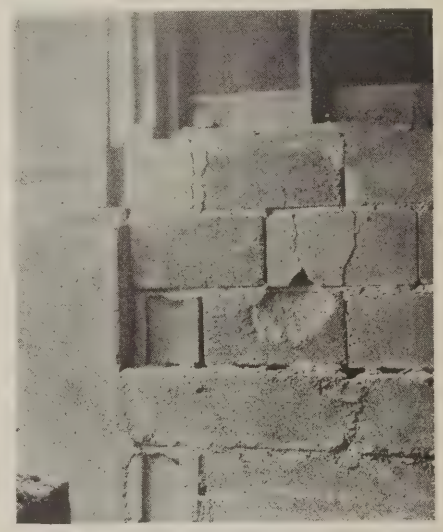
Girder framing in basement

Realty Co., the furnace location happened to come directly under the main girder and it was found that there was not sufficient head room to provide for a proper installation.

The way the difficulty was overcome was by setting one girder over another at the columns and framing the floor joists into the raised girder instead of allowing them to rest on top. Thus an additional 10 in. of height was provided. Note that the basement columns are concrete and that the girders are built up of 2 in. joists.

Why Walls Settle

POOR workmanship may ruin good materials and nullify the best intentions. The view herewith is an example, where one of the best building materials may receive a black-eye from crude and indifferent



Note cracked and chipped blocks

handling. From the header-blocks shown it may readily be seen that this portion of the foundation is at the corner of the building, a part that should be strongest but which in this case is far from having the required strength. The cracked block at the top and the chipped block below do anything but increase the strength of the foundation.

Concrete blocks make very good foundations for certain types of buildings and their use is to be encouraged, but such construction as is shown here is bound to make the owner dissatisfied with a block foundation, even if it does not result in actual damage. No contractor should attempt to "get by" with any such thing as the foundation shown above. It is such deeds as this that give the whole contracting business a bad name.

On the Job in Pennsylvania

Another Bricklayer's Scaffold

ILLUSTRATED here is a type of a bricklayer's scaffold very common in Harrisburg, Pennsylvania. It is built of 2x4s, and

H. T. Bayless, Harrisburg contractor, and one of his "scaffold" squares

is five feet square. The corner brace is cut from a piece of 1x10. These "scaffold" squares, as they are called, are set up as shown in the illustration, requiring only a few one-inch boards for bracing to make a safe and solid scaffold. Such a scaffold is

"Scaffold" squares in use

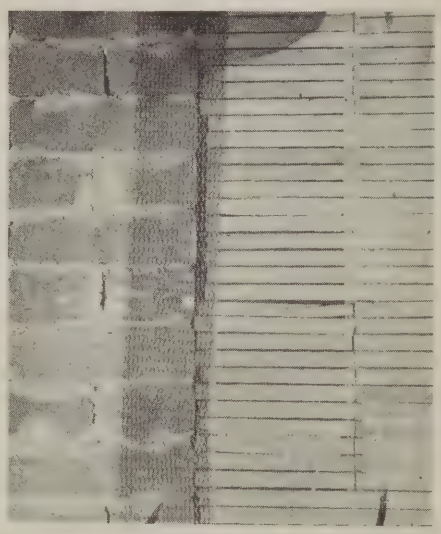
easily erected and easily dismantled, and the units are readily transportable.

The work shown here is by H. T. Bayless, of Harrisburg, Pennsylvania.

One Way to Prevent Plaster Cracks

FEW things make an owner as dissatisfied with his house as cracked plaster and no builder should overlook a chance to prevent cracking of plaster wherever possible. A customer with a grievance is a poor recommendation for a builder and where the expenditure of only a few cents is necessary to make a better job it is a poor business man who will attempt to save the few pennies and run the risk of having a dissatisfied client.

In the instance shown here, if a narrow strip of metal lath had not been used at the junction of the wood lath and the cement block, an ugly crack would have been cer-



Metal lath used to prevent plaster cracks

tain to result, as plastering was to be done directly on the cement blocks. This strip of metal lath cost only a very small amount and by its use the danger of a junction crack in the finished wall was considerably lessened.

This photograph was taken on a building operation by C. L. Long of Harrisburg, Pennsylvania.

Lintel for Stone Wall Construction

FOR the contractor who builds only with brick or lumber, the construction of a stone wall house might offer some serious problems. It is a form of wall construction entirely different from any other kind.

Stone walls are usually made eighteen inches thick because of the difficulty encountered in setting the odd sized pieces to form a plumb wall. Random stone can not be corbeled and the weight to be supported over an opening is equal to the weight of the entire stone wall above the opening instead of the weight of the corbel triangle above the opening as in a brick wall.

To support this heavy weight over a window frame, a rough stone arch is built over

Fig. 1—Outside of stone wall, showing arch

the opening on the outside of the wall as shown in Figure 1. This arch takes part of the load and also forms an ornamental detail for the exterior wall. On the inside of the wall a heavy lintel is set over the opening as shown in Figure 2. The lintel is built up of three 2x12 joists, separated from each other by short pieces of 2x4s, so that the three joists cover the width of the wall behind the arch and form a base upon which to lay stone over the opening. This lintel should have a bearing of at least 12 inches on each side of the opening and should be

Fig. 2—Lintel of 2x12s on inside of wall

set up above the window frame high enough so that it will not touch it.

According to Mr. A. J. Shade, the Harrisburg, Pennsylvania, contractor on whose job these photographs were taken, a stone wall opening treated in the foregoing fashion should give no trouble.

On the Job in Louisiana

An Inexpensive Way to Protect Exterior Trim

A CHEAP and easy way of keeping mortar drippings off terra cotta or cut stone exterior trim is shown here. This contractor simply uses the old paper bags in which cement was delivered and sets them directly into the wall to hold them in place. The accumulation of mortar

Old paper sacks protecting terra cotta trim

drippings soon becomes heavy enough to prevent the paper from flapping in the wind. This photograph was taken on a job of the Bradshears Construction Company, of Shreveport, Louisiana.

Base-Board Nailing Blocks in Brick Walls

MANY contractors when setting nailing blocks for baseboard in brick walls simply place the block in the wall and let it go at that. The result is that some blocks are loose and others tight and the contractor hopes that the odds are with the tight blocks.

View showing nailing blocks and horizontal strip

The Shreveport, Louisiana, builder on whose job this photograph was taken, does not believe in trusting to luck to provide a firm fastening for his baseboard. He uses a bit more labor than simply setting the blocks between the bricks. He cuts all the blocks to length and nails to them a thin horizontal strip which is set between bricks in the wall. A lath will do. This horizontal strip is held at several points in the wall and is therefore set in the mason work quite firmly, and any vertical piece fastened to it is also bound to be held tightly.

This little "kink" requires a little more labor than the ordinary way, and a lath or two, but its use results in a solid base board fastening.

Braced-Frame Corner

THE strongest part of a building should be the corner and it is surprising to note how many contractors fail to take notice of this fact. The illustration shown here is of a corner post in a braced-frame construction building. Note the heavy corner posts and the diagonal bracing which serves to stiffen the corner.

Stud bracing at corner of building

A New Bricklayers' Scaffold

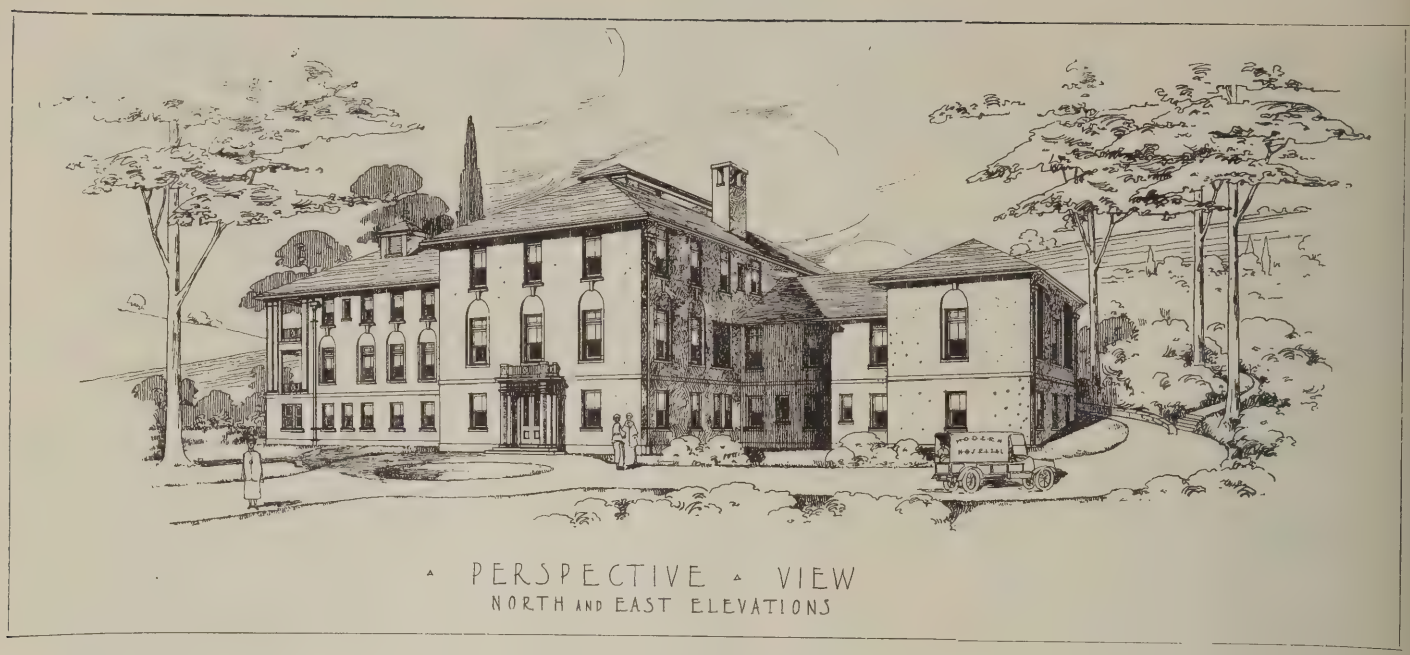
TO facilitate bricklaying, Anderson and McDonald, contractors of Shreveport, Louisiana, make it easy for the bricklayer by providing him with a small scaffold in addition to the usual tall mason's horses. This low scaffold is set as shown in the illustration, and the mason stands upon it so that it is not necessary for him to bend his back every time he wishes to pick up a brick. When the wall height is such that the small scaffold no longer suffices, it is removed and the larger one is drawn up to the wall. Then another scaffold, higher than the large one shown,

Bricklayer illustrating utility of new scaffold

is set in place and the work proceeds as before.

This second scaffold is made high enough so that by working on it the bricklayer can carry the wall one-story high.

The slight investment in the extra scaffolding and the small labor cost required to place it is considerably overbalanced by the added efficiency of the bricklayer.

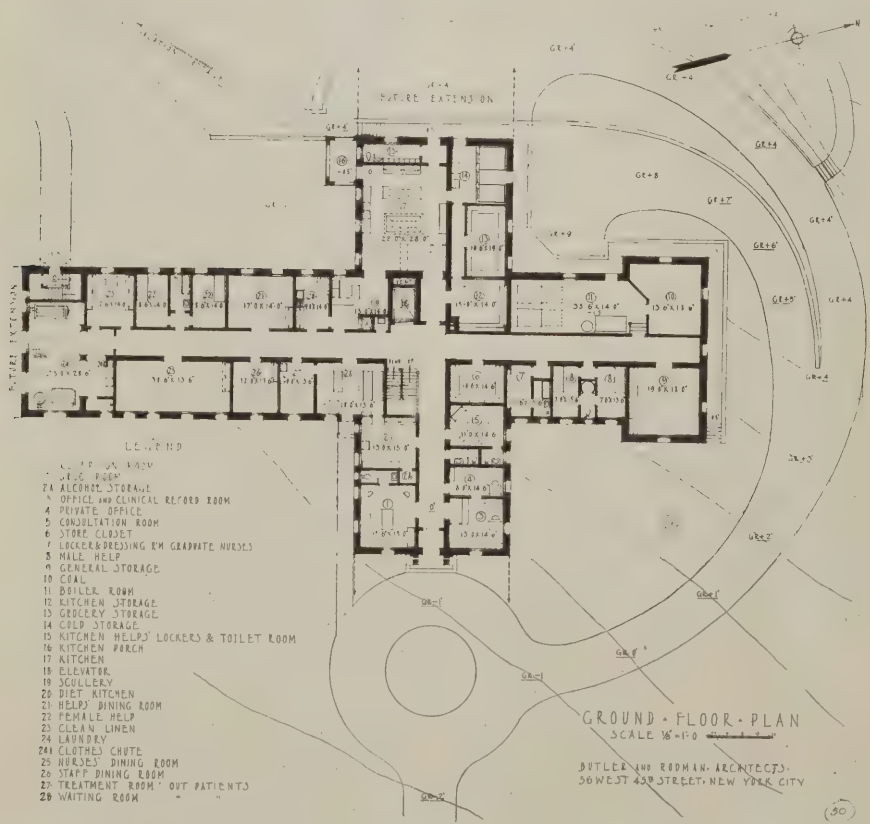


PERSPECTIVE VIEW
NORTH AND EAST ELEVATIONS

A Simple Solution of the Small General Hospital Problem

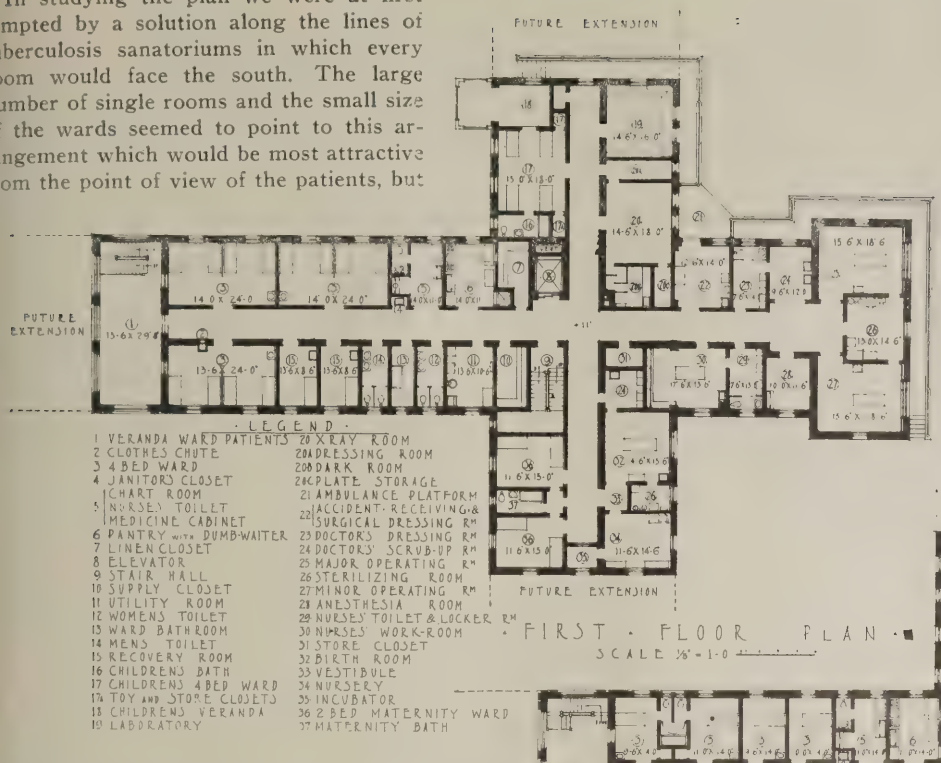
By Butler & Rodman, Architects

AS in any architectural design, so even more in the case of a hospital is it essential, first of all, to work out a plan which shall satisfy the needs set forth in the program. I have never forgotten the remark made to me by a great French architect: "On a good plan you can make forty good elevations, but first you must have the good plan, and on a bad plan no good elevation is possible." This is a precept too often neglected by architects who start out with the idea of a beautiful exterior and forget that it can only proceed from a good plan.



Recently "The Modern Hospital" conducted an international competition for designs and plans for a small general hospital. A jury of hospital authorities met in Chicago on March 5-7, 1923, and made their selection of the best plans submitted, for the purpose of awarding the $1000 prize money offered. Butler & Rodman, Architects, of New York, won first prize, and their design and plans are reproduced here, together with their comments on them. The readers of National Builder are frequently required to give their advice on subjects of this kind, and they will be interested in seeing how the problem of the small general hospital is worked out by specialists in this type of building. The illustrations in the article are reproduced through the courtesy of "The Modern Hospital."—The Editor.

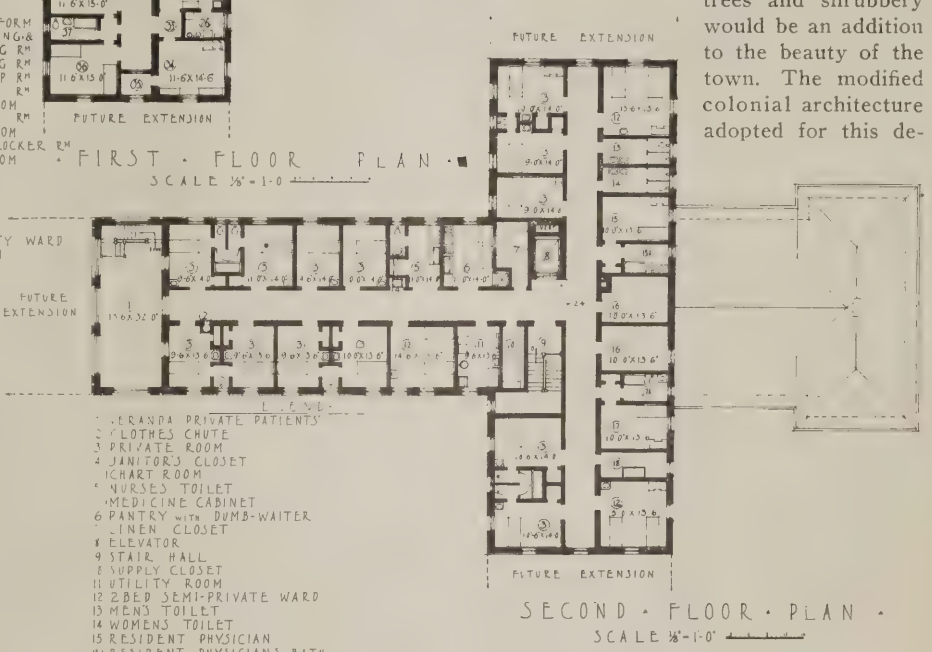
In studying the plan we were at first tempted by a solution along the lines of tuberculosis sanatoriums in which every room would face the south. The large number of single rooms and the small size of the wards seemed to point to this arrangement which would be most attractive from the point of view of the patients, but it soon became apparent that the great length of the building from east to west would increase the labor of the nurses beyond all reason, while minor objections were the excessive length of heating and plumbing lines; so we abandoned the idea in favor of the plan adopted, in which every patient's room has east, west or south exposure.



· FIRST · FLOOR PLAN ·
SCALE ⅛"-1-0

This plan appeared to us especially economical in that it permitted the central location of stairs, elevators and service rooms, and still provided for the segregation of the different departments, and allowed for future expansion in three directions.

We assumed that the hospital was to be built in a climate where protection from cold winds should be considered, and therefore selected a site on ground rising gradually toward the northwest. This permitted us to place the business, admitting and out-patient sections of the hospital in the basement on the east, while the slope permits of access to the ambulance entrance on the main floor level. We felt also that it was desirable to place the entrance away from the operating rooms, so that the incoming patient need not be greeted by the blank stare of operating room windows.



· SECOND · FLOOR · PLAN ·
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The placing of kitchen and laundry was also a difficult problem. In a larger hospital these services may easily be removed from the hospital proper, but when that is impossible for reasons of economy, as in this case, it reduces itself to the question of what are the least objectionable locations.

Of all the patients, the children would be least annoyed by the noise of the kitchen, so it has been placed under the children's ward, and for a similar reason we placed the laundry under the main airing balcony, where its presence would be least noted. Other points in plan arrangement which appeared to us worth while are the placing of the ambulance entrance out of sight of the patients, and the placing of the x-ray service and laboratory near to the operating department.

Our design for the exterior provides for stucco on brick or concrete walls with roof of tile or slate. The number of beds called for would imply that the hospital was to be designed for a town of approximately ten thousand inhabitants, where a plot of ground of ample size would certainly be available, and we felt that a cream-colored building with green window trim and a red or green roof, surrounded by lawns, with trees and shrubbery would be an addition to the beauty of the town. The modified colonial architecture adopted for this design seemed to lend itself to the exacting requirements of the hospital plan and to produce the most agreeable exterior at least expense.

All spans of girders and beams are relatively short; one of the corridor walls in each wing has been carried up as a bearing wall in order to avoid the use of steel columns and heavy girders. The construction would, of course, be fireproof throughout. The total cubical contents of the building figured from the basement floor to the average height of the roofs amounts to 415,000 cubic feet.

· WEST · ELEVATION ·
SCALE ⅛"-1-0

· SOUTH · ELEVATION ·
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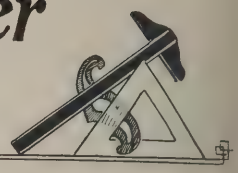
Suggestions for the Beginner in Architectural Drawing



By V. L. SHERMAN

IN the first article the writer pointed to four reasons for the use of drawings. There is a fifth reason which should be of still greater importance to the beginner. Drawing or sketching may be used to the greatest advantage in fixing ideas in the mind. Just as surely as you put it down on paper will construction define itself. One may believe his ideas fully developed and safe for use after a little mental digestion, but attempts at graphic proof will show he is wrong. This reason, the fixing of ideas in the mind, is urged by the writer as the chief reason for drawing for beginners.

The prospective owner comes to the builder with certain notions as to what he wants. As a matter of fact those notions, while more or less vague in speech, are firmly imbedded in his own mind. "He can tell what he wants when he sees it," and it is up to the builder to persuade him by word of mouth, or otherwise, that those notions can be realized within a certain price. The fact that the notions are vague in speech makes it imperative that the builder satisfy his client and insure himself a profit before the signatures are down. A small five-room, two-story house, no attic required, but full basement, furnace heat, fire-place in the living room, open stairs from near front door, French doors from living room into brick-paved pergola. Must have a hall between kitchen and living room, and side door. Will not tolerate an outside door in kitchen. Trellisses here, built-in seats there. Casement windows all around, except, perhaps, in the kitchen. These are the notions that the builder has to work on within a limit of so many dollars. Since the house is quite small the suggestion of an architect's services might mean the loss of a client to some other builder who could paint a rosy future and whose hide would be too tough for the thorns. But the builder who can play at least a part at being his own architect would chase the cat out of the kitchen and clear the table for work. His price would start him with an approximate volume, and before turning in he would have drawings definite enough to talk sensibly with his client, and definite enough to back any arguments against this folly or that; to turn money into places of really greater importance to the owner than some "notion." In short he would have something to sell.

From this point the sport of drawing would begin. The original drawings could be blue-printed and a set handed to the owner with careful explanations and the request, that when they were thoroughly gone over, notes be made in a small notebook of wanted changes or additions. Costs should be a most important part, and the normal man is quick to grasp the meaning of costs when they are explained over a set of drawings. If the builder is tactful, and if the preconceived notions of the owner are not absurd in the matter of costs, work is almost certain with the first set of drawings.

The beginner will find his own notions just as vague as the prospective owner's, and the logical means for discussing construction with himself is over the drawing board.

In Fig. 1 is shown various types of lettering used in drawing. Since drawings are for the use of clients as well as workmen they should present an attractive and *workman-like* appearance, and they should be easily read. The writer has always favored the capital letters, or upper-case, as against the small letters, and the vertical type as against the slant. However, as mentioned previously, lettering is a characteristic, and the best letter is that one best suited to the draftsman. It should be added that lettering is the bugbear of most beginners, and constant practice is the cost of good work. Try the letter *O* and the down-stroke *l* until you can get them uniform and without effort. A naturalness in lettering lends greatly to the appearance of a drawing.

Elbow room is very important to the draftsman. By that is meant that his drawing board should be fairly large, but not less than 20x30 inches, that his T-square extend over the length of the board, that his triangles be of sufficient size, and that the table or bench he uses shall be clear of all obstructions, under, over, and around. Some insist that all work shall be done standing, others that a high stool is to be preferred. Either way will do so long as the draftsman *looks down on his work.* Lighting is quite important. Poor light will tire the eyes and produce real fatigue. Light reflected from the surface of the drawing paper will cause headache. The best light is daylight without direct sunlight, and for night work a lamp above the head, forward, and a little to the left, will be most devoid of shadows. Indirect light is by all means the best as there is nothing so irritating as shadows on the paper.

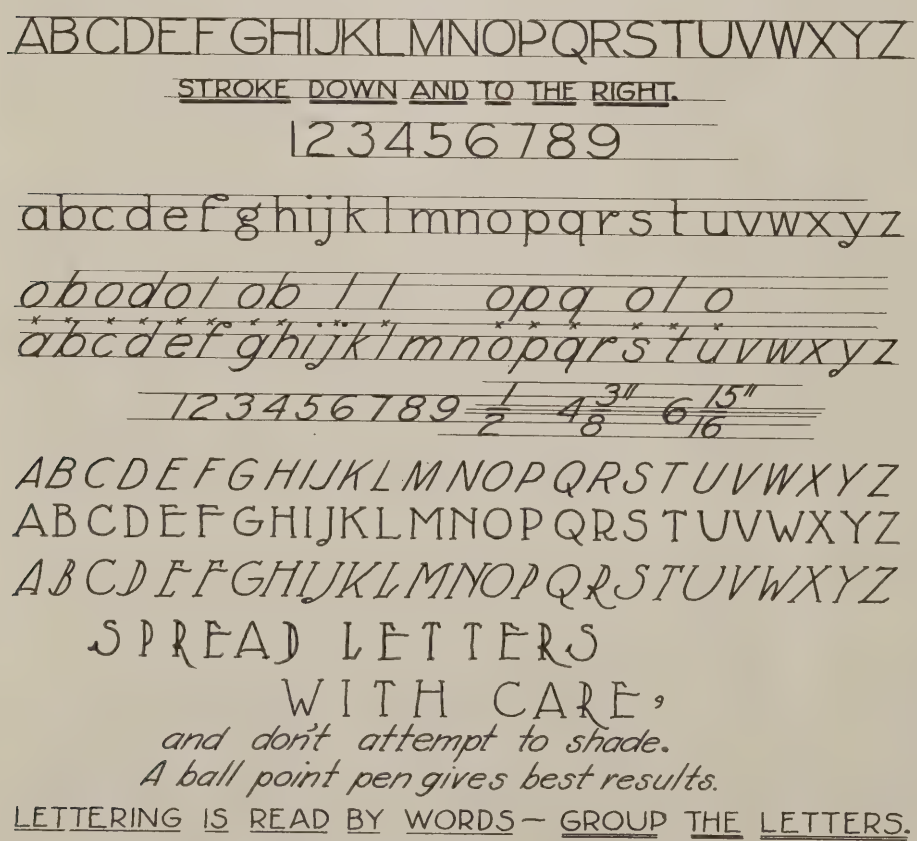

ABCDEFGHIJKLMNOPQRSTUVWXYZ
STROKE DOWN AND TO THE RIGHT.
123456789
abcdefghijklmnopqrstuvwxyz
123456789 1/2 4 3/8" 6 15/16"
SPREAD LETTERS
WITH CARE,
and don't attempt to shade.
A ball point pen gives best results.
LETTERING IS READ BY WORDS — GROUP THE LETTERS.

Fig. 1—Various types of lettering used in drawing

A very good board can be made of pieces of straight-grained pine glued together, the grain running the length of the board. The under side should be grooved about halfway through, at intervals of 1½ or 2 inches. A strip of hard wood is let into each end of the board to provide a base for the T-square. These strips should be dressed carefully and inspected now and then for straightness. Never consider the two ends as parallel although they are built to be so. Generally it is about as economical to buy a good board as to make one, but do not buy a cheap board.

The T-square should be a good one with some heft to it. The plain head is to be preferred to the swivel head, as the latter are more or less in the way and do not present enough advantage to offset this. The edge of the blade may be hard wood, ebony, or so-called amber, which is transparent. The last has a distinct advantage, especially in tracing. T-squares should be handled carefully when not in use, should not be allowed to warp so as to lift the midsection from the paper, or to become loose in the head. One fall from the board is more than likely to ruin the set of a square. A T-square should not be depended on to carry exactly 90 degrees between the head and blade. It performs its function when it furnishes a reliable base line for the operations.

The triangles should be of celluloid. The wooden ones warp out of shape, and the black rubber triangles seem to have a "blackening" effect on the paper. They should be large enough for comfort and not too large for ease in handling. New triangles should be tested as shown in Fig. 2, and returned to the dealer if faulty. Do your own testing. Celluloid triangles will warp out of flat if not allowed to remain in

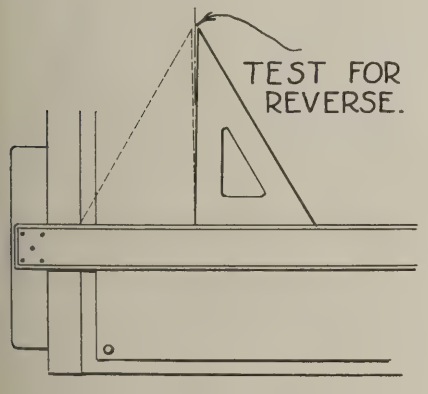


Fig. 2—Testing a triangle

that position. Unless they are flat they cause constant annoyance.

Scales are purchasable in great variety. For the architect the one most used is triangular in section and provided with 11 sets of measuring units. For these a clip should be used to keep the triangle in its proper position thereby making it unnecessary to hunt over the 11 for the proper scale each time. As a good share of the drawing is likely to be at a scale of ¼ inch to 1 foot a flat boxwood scale with that unit and inches will prove much handier. Flat scales may be bought with practically any unit of measurement graduated.

Paper should be used having plenty of body to it and a good surface. There is the greatest difference in papers of apparently the same grade. Try out the corner of a sheet for erasing. Buff or cream colored paper is better for the eyes than white. Paper with a trade-mark showing is safer

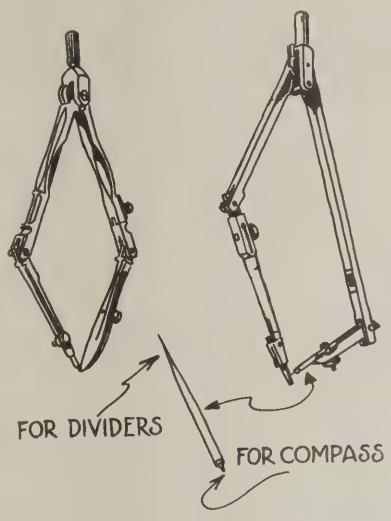


Fig. 3—Be sure your compasses will stand the bow-leg test

than without and, when you are once satisfied, marked paper is easily duplicated. While on the subject of paper the writer wishes to suggest the use of tracing paper. A good quality of tough tracing paper or vellum will give an excellent working surface and eliminate a great deal of time in later work when redrawings are necessary. He has found good tracing paper, when well handled, the full equal of cloth in inking and, of course, far better in penciling. It will stand as much abuse as any but the finest quality of paper, and has the advantage of transparency for copying or blueprinting for reproduction. Tracing cloth is, or used to be, filled white linen. It has a glossy surface and a dull one. Inking may be done on either side after the surface has been cleaned with soapstone powder or chalk dust. The dull surface is the handier to use.

Thumb tacks, German silver or brass, flat heads, are the best to use. The stamped or cut variety do not get as strong a grip on the paper and in some boards have a tendency to pop out. The tack should be pressed clear in as it is the head which really holds the paper, and besides the head should have as little prominence as possible. If the tack breaks in the board it is better to drive the broken pin in a trifle than to cut a hole in the board with a pen knife to dig it out. Keep the surface of the board perfectly free of bumps and holes.

Pencils should be of top price and about 4H in hardness. This recommended 4H in the old Koh-i-noor is, I believe, the best average pencil, but the American pencil makers seem to have their own grades of hardness and, at that, no two makes seem to run the same grades. Suit yourself, but get a pencil which will not leave a trail of dust or one which will groove the paper. In this connection I wish to point out that the points of pencils are of great importance to beginners. The habit of keeping your pencil points in shape will save many a cuss word later on. For line work use a screw-driver point at least a quarter of an inch long. This point will hold up much better and when drawing along a straightedge with the pencil held vertically one is always sure of the placing of the line without watching the point. Round pencils will roll into wet ink or off the board.

As for erasers E. Faber's emerald or ruby eraser will clean off anything short of stains without leaving any stain of their own. These two are mentioned because colored erasers may leave an irremovable stain and ink erasers or a pen knife will spoil the surface for further work. When the amateur draftsman becomes professional is time enough to resurface spots on cloth or paper.

A small file or block of sand paper should be kept (off the board), for use in sharpening pencils.

As for instruments you will find all sorts, German, British, Japanese and American. Every firm of manufacturers has a variety and all of the firms are desirous of satisfying their customers. The better instruments are free from fancy attachments. They are simple and of good steel, and will really never wear out. Be sure the pen is of first-class steel and that the compasses will stand the bow-leg test. (Fig. 3.)

To the beginner minute directions at the

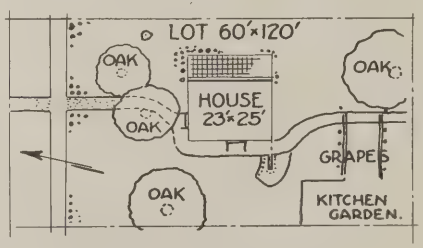


Fig. 4—Laying out a lot

start are likely to be lost through lack of application. Even the simplest instruction is likely to fail if reason does not back direction. The first example in drawing is going to deal with proportions more than detail, and a simple set of plans will be shown for the "five-room, two-story frame house." Imagine a lot as shown in Fig. 4, and see what can be done on paper. Scale your outside walls 6 in., partitions 4 in., outside doors 2 ft. 10 in., inside doors 2 ft. 8 in., stairs 3 ft. 4 in., small fireplace with two-flue chimney, each flue 12x8 in.

Builders' Offices as Advertisements

Harmonizing the Spectacular with Good Taste

By C. B. Orwig

ARE the builders of our young, mushroom cities exercising good taste in the architectural creations rapidly reclaiming the barren wastes or are they in a state of coma,

Fig. 1—Are you using something like this for an office?

aesthetically speaking? The answer may be found by making the rounds of the offices of the men largely responsible for the looks of the "City of Destiny" or the "New York of the Future" or whatever the appellation its Chamber of Commerce uses on its stationery, not to listen to their endless flow of chatter but to observe how they are housed. You can draw your own conclusions as these straws show how the wind is blowing.

Certainly people judge a great deal by outward appearances; and faith in the ability of a real-estate developer or builder to deliver an attractive home is considerably shaken by the character of his office if it looks, as some do, like the one shown in Fig. 1.

There comes a time when a progressive builder, discoursing volubly on "Our City Beautiful" finds that his talks on civic improvements will sound more convincing when delivered from an edifice that does not give the laugh to his optimistic remarks. Beautifying, like charity, begins at home. When this man, say Smith, fully realizes that fine houses make fine cities as surely as fine feathers make fine birds, he repents of his early mistakes and going to a first-class architect says, "I want a little office that'll be a credit to me and the town. Draw me a plan and make it snappy." The architect grins approvingly as he pulls from a dusty drawer pictures of stage scenery, illustrations from fairy books, drawings of play, doll and bird houses, then giving free rein to his pent-up fancy, he paints his idea of a glorified toy house in brilliant water colors. Smith objects at first, complaining it is "too jazzy" or "too different," but the architect begs him to try it just once on his

Fig. 2—A builder's office designed by an architect

phonograph, so to speak, and Smith consents with inward misgivings. When the office is completed, the exterior painted in

Fig. 3—Another example of an architect's design

gray-blue with deep blue trimmings, the roof rivaling Joseph's coat of many colors and the interior furnished in good taste, its beauty and originality attract attention from every quarter of the city. (Fig. 2). Homeseekers flock to Smith's door, convinced that a man who practices what he preaches is the man for their money. Smith, surprised but delighted, no longer orates on "the future paradise of our magnificent city" from an unsightly pile of boards resting on the weed infested vista, but now ensconced in his own little oasis in the desert of ugliness, he sketches the possibilities of his "best buys" convincingly and makes his sales.

Jones, a business rival, who hooted at Smith's "nut house" while in process of construction, sees the result of the experiment with envy and alarm. Going to the best architect available, he requests a plan for an "office that'll beat Smith's to a frazzle." The architect smiles. This is the most fun he has ever had, professionally, so he casts aside fifty-seven varieties of conventional bungalow designs to sketch a "crazy house"

Fig. 4—Reaching the spectacular

for Jones, which when erected (Fig. 3) surpasses Smith's and makes every other office seeker (not used in a political sense) sit up and take notice.

Brown sees Jones' office and goes him one better by raising a more elaborate and picturesque domicile. Drawing upon the rainbow for his color scheme, his finished product can be passed by none but the blind without eliciting admiration. (Fig. 4.)

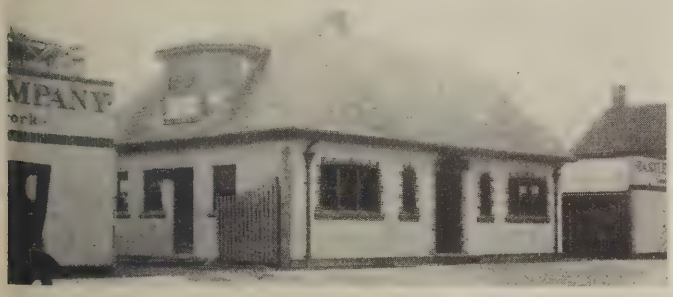
Fig. 5—Going his competitors one better!

Fig. 6—A striking office in red stucco

Green, another far-sighted builder, digs deeper into his bank roll and constructs for his office an English cottage with stucco walls and piebald roof. He "landscapes" the bit of ground surrounding and in his parking places immense jars, the kind that were used by the "Forty Thieves" in Ali Baba's time. The effect of the whole is exceedingly picturesque and Green's customers feel they cannot go wrong in following his example or advice. (Fig. 5.)

Another firm is inspired to build a red stucco office which, though of conventional shape, is rendered striking by the garden running the full length of the front in which cactus and other plants are featured, insuring a more than passing glance. (Fig. 6.)

The pictures shown are from a single street in Los Angeles, Western Avenue, and others of equal attractiveness can be snapped on the same thoroughfare. These offices that are "different" pay well if only by their advertising power, but they do much more than that—they add beauty, gayety, life to the municipal scenery, and fortunate is the city possessing many of them. And all joking aside, they are good advertisements.



Office of Bartlett & Co., Binghamton, N. Y., building supply dealer

Office of J. A. Mahlstedt Lumber and Coal Co., Rye, N. Y.

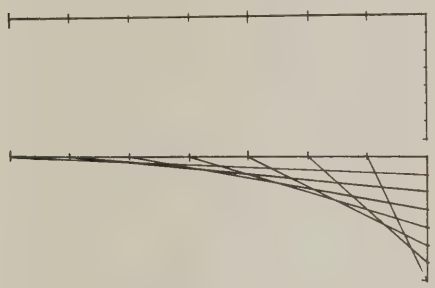
Office of the Restrict Lumber Co., Detroit, Mich. Abraham and Woods, architects

KINKS From the Job and Office

By V. L. Sherman

The Ellipse Again

THE idea shown here has to do with forming an ellipse without the use of a compass, and B. H. W., of Austin, Texas, who sends it, says it is easier than the methods previously shown. He writes: "I notice in the NATIONAL BUILDER for June some methods for describing an ellipse which look to me to be quite complicated,



Figs. 1 and 2—Simple method of forming an ellipse

especially for a beginner. So thought I would give a simplified method of what is called a "true ellipse." It has been used here for years. Lay out on board one-half the length of the span, and the height you want the ellipse in the center, as shown in Fig.

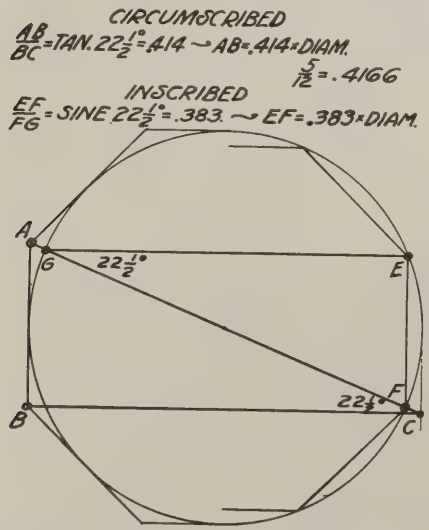


Fig. 3—Obtaining the length of one side of an octagon

1. Then divide your height into one inch spaces, and your half-span into as many equal spaces as these one-inch spaces in the height. Draw a line from the center mark to the top one-inch mark, then the second, and so on down the line as per Fig. 2.

"I also notice quite a bit of discussion on octagons at different times, but have never seen a rule for obtaining the length of one side of an octagon of any diameter. Each side of an octagon is equal to 5/12 of the diameter of a circle described within the octagon. This may not be accurate enough to work steel but it is close enough to work wood."

The editor submits diagrams in Fig. 3.

New Use for Old Square

A. B. R., of Albany, Ga., writes: "I had an old square which I cut off at 3½ inches on the blade, and which I found so useful in laying off studs that I am wondering why the manufacturers of take-down squares do not make the short tongue on the 16-inch scale instead of the 24-inch. See Fig. 4.

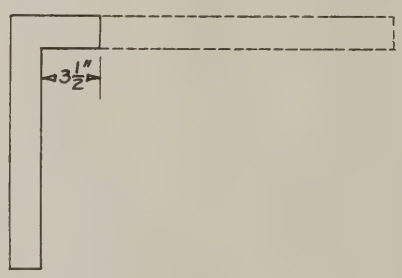
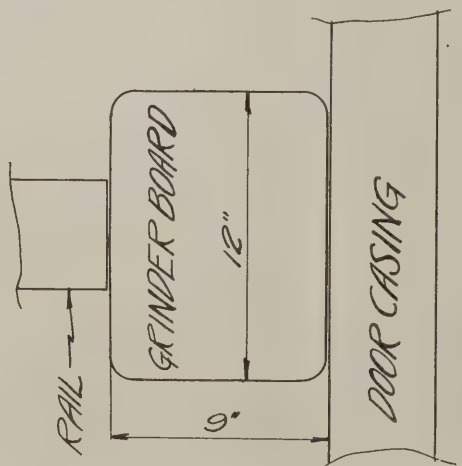


Fig. 4—Short-tongued steel square

Coffee Grinder Board

ONE of the many petty annoyances a housewife must overcome when moving into a new house or apartment is the location of her coffee grinder. It is generally difficult to find a place where it can be firmly attached to the wall, and the usual thing is to fasten the grinder more or less firmly to a convenient casing or chair-rail.

This, however, is not satisfactory as casing is not intended for this purpose, and continuous use of the grinder is liable to loosen the casing. A small piece of board, finished to harmonize with the existing trim, and firmly nailed in some convenient place as shown in the diagram, will provide a good base upon which the coffee-grinder may be fastened. By using such a board instead of any place that happens to present itself, there will be no unsightly holes left in the trim when the coffee-grinder is removed from the wall.



A coffee grinder board

Hen House Ventilator

FIGURE 5 refers to a ventilator for hen houses, and is submitted by W. W. M. "The drawing explains itself, and it will be seen that by lowering point *A*, of *C*, *B* will be allowed to fall back. With a little practice you can place *B* at any angle desired."

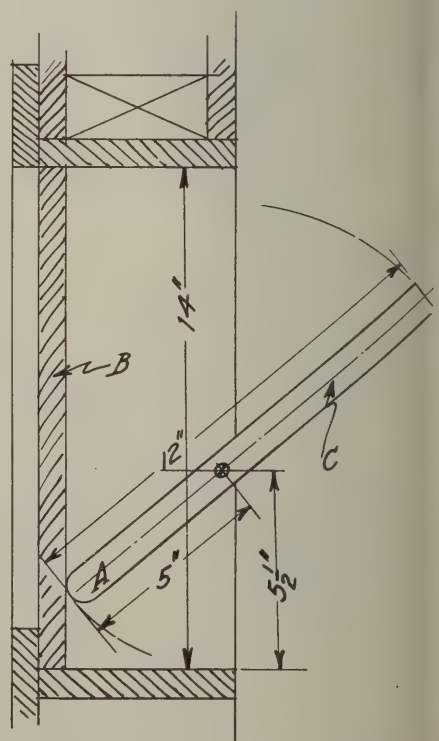


Fig. 5—A ventilator for a hen house

A Pergola Plan

THE "Kink" editor lifted this from the editor's desk. As a contributor to this department he hopes Mr. McCaslin will feel at home: "A few days ago I was asked by a man to build him a pergola. He had no plans. I told him I had a book of 'Construction Details' in which I thought I could find him a suitable plan. He wanted it placed in center of his rear lawn as a kind of 'lovers' retreat.'

"I got down the book mentioned and was much disappointed that it had not a single pergola plan. This was the first time it had failed me. I proceeded to formulate plans of my own. He was highly pleased with the design and I immediately erected it. A few days later another fellow was passing this yard and saw the pergola and hastened to me and have one built just like it, but of better material, i. e., cypress, cedar and redwood, instead of yellow pine and oak. I am inclosing plan as it was erected. I believe a few of these in a neighborhood will cause an 'epidemic' of back yard pergolas.

"This plan is eight feet square outside of

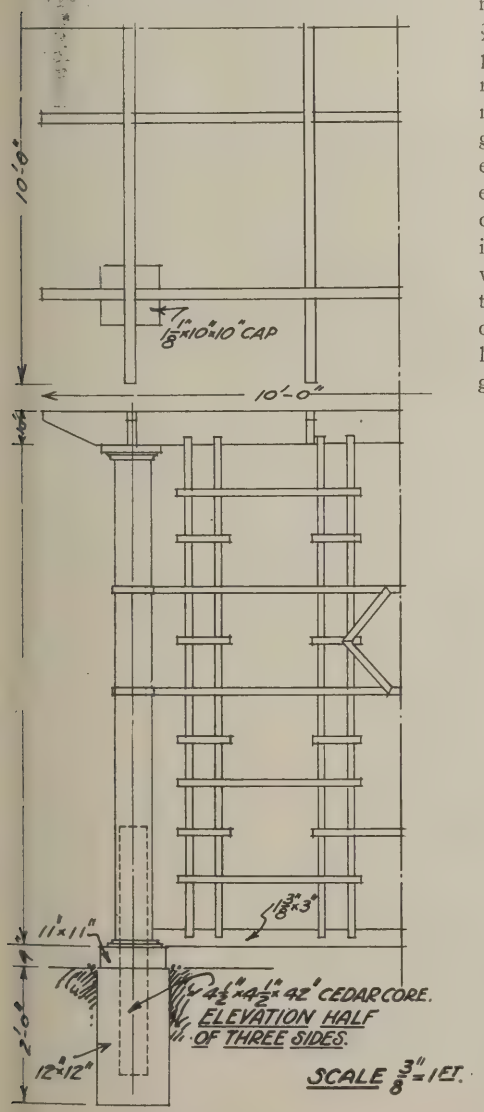
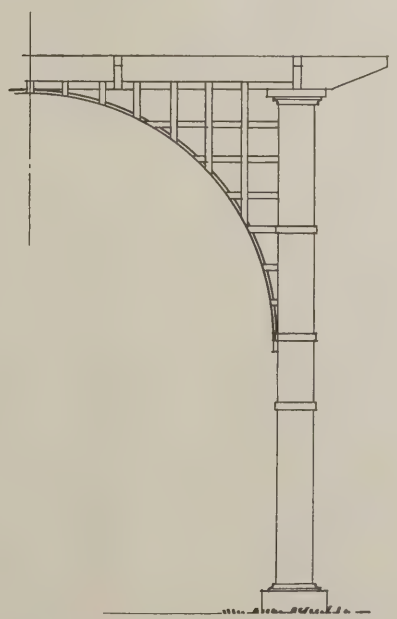


Fig. 7—How the columns are anchored in the ground

The completed pergola adds attractiveness to the grounds

columns. It is seven feet high above the concrete base which is 24 inches in the ground and four inches above the ground. The upper four inches is reduced to 11 inches square while portion in ground is 12 inches square. The columns, four in number, are constructed each to two p. c. ¾-inch by 4½-inch by 7 feet long and two pieces ¾-inch by 6-inch by 7 feet. This makes the column 4½x4½ inches inside measurement and 6x6 inches outside. To give the structure a firm grip on mother earth, a cedar post 4½x4½x5 feet long, extending up into the column 42 inches and down into concrete 18 inches—the top four inches of concrete being above grade and well finished with trowel and 'edger.' All timber in the last one built is of cypress for columns and 'grid' timbers with redwood lattice, and cedar cove in columns and ground. A scotia mold ¾x⅞ inches makes



Note the few inches of concrete above grade

An arched entrance to the rear lawn is like the arch to the pergola proper

the finish at top and bottom of columns. This mold rests on the concrete base at bottom. To build it complete requires:

8 pcs. ¾"x4½"x7' } Columns
8 pcs. ¾"x6"x7' }
4 pcs. 1⅛"x10"x10" column caps
8 pcs. 1⅜"x6"x10" column grid timbers or rafters
3 pcs. 1⅜"x3x8' bottom rails
4 pcs. 4½x4½x5' cedar posts
40 ft. lin. scotia
375 ft. lin. lattice
½ bbl. cement
½ yd. gravel
2 cu. ft. sand
$35.00 was bill here in Indianapolis for all the lumber.

"Casing and finish nails q. s. 8d and 10d with small clout nails for lattice, 2d fine make good clout nails but copper 'clouts' are better—⅞ inches long.

"The archway is latticed 'between' the columns so as to member with front grid. Other three walls on outside surface, arch circle of bent lattice doubled.

"I enclose some snap shots of the finished work. It will be noticed that the vertical members of the lattice are arranged 'two and two.' Each 'two' span a six-inch space, i. e., 3¼ inches apart and are placed six inches from column. The wider spaces, three in number, are 15-inch sides and 18 inches for center one, where the irregular hexagonal window is. The 'cross' lattice are 8 inches on center short and long mixed up as shown in picture and drawings.

One view shows an arched entrance way over entrance to the rear lawn. It is same as arch to pergola proper but one foot narrower—six feet instead of seven feet inside spacing. Two cross bars are over this opening (archway) blocked apart to exact diameter of columns. This allows for lattice to be attached to surface of both bar and column. In pergola proper, the lattice is cut between columns but on surface of grid bars.

"A meridian straight line passes through the center of entrance archway and center of circular flower bed seven feet back and center of pergola proper 17 feet back of flower bed. Residence is to left of entrance archway picture. A belt of lattice is carried around columns wherever a 'cross lattice' touches it."

Cutting Off a Taper Column

F. B., of Norristown, Pa., proposes this method in cutting off a taper column. See Fig. 6. "Take square on edge *d c*, from point *a* where cut is to be made, and draw

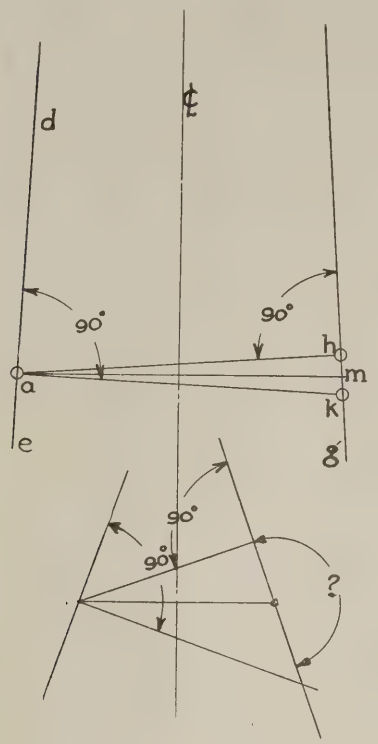


Fig. 6. Method for cutting off a taper column

line *a k*. Then, with the square on edge *f g*, make another line *a h* from *a*. The line *a m*, half way between these two is the required square line. Continue this operation around the post and you have it square with the axis of the post."

Removing Finish From Old Floors

W. D. B., of Indianapolis, sends us a "hint which I found of great benefit to me in refinishing my floors this spring. The surfaces of old floors are more or less uneven, and a floor scraper will not remove all of the finish. An easy method of doing this is to apply varnish remover, allow to stand long enough to soften the finish, then use a wire brush such as is used in cleaning stone work. This quickly removes the varnish and whatever dirt may be in the grain of the wood."

Preventing Roof Leaks

FROM Bangor, Maine, H. H. writes that the following method has proved successful in his part of the country. "First lay the double course of shingles, then, starting five inches up from bottom of course, lay a sheet of waterproof paper over roof boards, which should be laid closely together. Then trowel over this paper a coating of any of the well known brands of plastic cement, and shingle up the roof as usual. The cement makes a watertight joint around the nails as driven through the shingles, and the result is a section of roof that will hold water. The coat of cement should be about ⅛-in. thick."

From Gloversville, N. Y., E. J. D. writes: "The ice melts because of the difference in temperature between the inside and the outside air. A precautionary measure would be to remove several attic windows and replace with muslin screens during the cold weather. (Rather hard on the coal pile.)

"In case of new shingling, a method tried here for several years may be of interest. Before shingling run a sheet of smooth, two-ply roofing placing lower edge at line of crown mould. Then, over this, place a course of shingles at the eaves line, bringing them together at angles of valleys. At this point run them lower and cut to conform to desired shape of lower end of valley. This is done to support the end of the paper valley used. Now take a sheet of slate surfaced roofing the required length of the valley and split it lengthwise. Place in valley in regular way. Cover this with a full-width sheet of slate surfaced roofing. Mark valley lines 3 inches out from center each way at the ridge and 6 inches each way from point of eaves. Next, take plastic roofing cement and spread with a paddle a coating about 6 inches wide from butt of course laid. Lay the second course of shingles. This makes the first or double course of shingles. Strike a single chalk line and spread more cement above this line, covering about an inch above the line of exposure to the weather. Follow this method until the roofing paper at the eaves is covered. This point is well above the plate line. Also, plaster the wood valley shingles the length of the valley to the slate surfaced roofing. A lot of fuss, but a guaranteed job, and may save time."

The Plumber—An Alibi and a Legend

"THE much-abused plumber" was defended recently by Colonel William Archer of Evansville, Ind., representative of the National Trade Extension Bureau of the Plumbing and Heating Industry, in an address before 250 plumbing supply salesmen in the Hotel La Salle, Chicago. Complaints because a plumber fails to bring along his tools are unsound, Col. Archer said, because there are more than 12,000 items that may be needed on the ordinary job, and proper tools and materials cannot be brought until the dealer knows what is required.

A LEGEND

The Bulletin of the Illinois Society of Architects wants to know how this Babylonian legend sounds to you:

The Mugheir Manuscript, published by the American Archaeological Association, containing the so-called Annals of the Ussurbanipal, unearthed by the American Commission early in the present century, reveals the details of commercial transactions, and many of the very documents in use by the Babylonians 2000 to 3000 years before the Christian era.

One of the most interesting records is the Story of the King's Wrath against the Repairer of Pipes, printed in chapter 16 of volume IV of the Annals. It reads in part:

Then Neriglissar, the Repairer of Pipes, came down into the palace as he had been commanded and bowed him down before Medorach, the King.

And Merodach, the King, made Neriglissar make whole the pipe wherein it had been broken.

"It is a bad pipe," said Neriglissar, "would that I, and not another, had laid it in the palace, so it had been better done."

Neriglissar, the Repairer of Pipes, worked upon the pipe where it had been laid in the wall and about the third hour he said unto Ashboka, the Chamberlain of the King: "Listen, O right hand of the King. I have not the mallet that I need withal," so he departed and returned to his shop for the mallet.

And he was gone for about two hours and when he came again to the palace he brought with him the youth, Labashi, and Labashi was of the same brotherhood with Neriglissar, the Repairer of Pipes.

And Ashboda, the Chamberlain, said unto him, "For what purpose is the youth?"

"For to hold the mallet when I am not using it," said Neriglissar.

On the first day of the month there came to the King's household a writing from Neriglissar, the Repairer of Pipes, and there were writ therein the charges of the Repairer of Pipes, and these are the words of the writing:

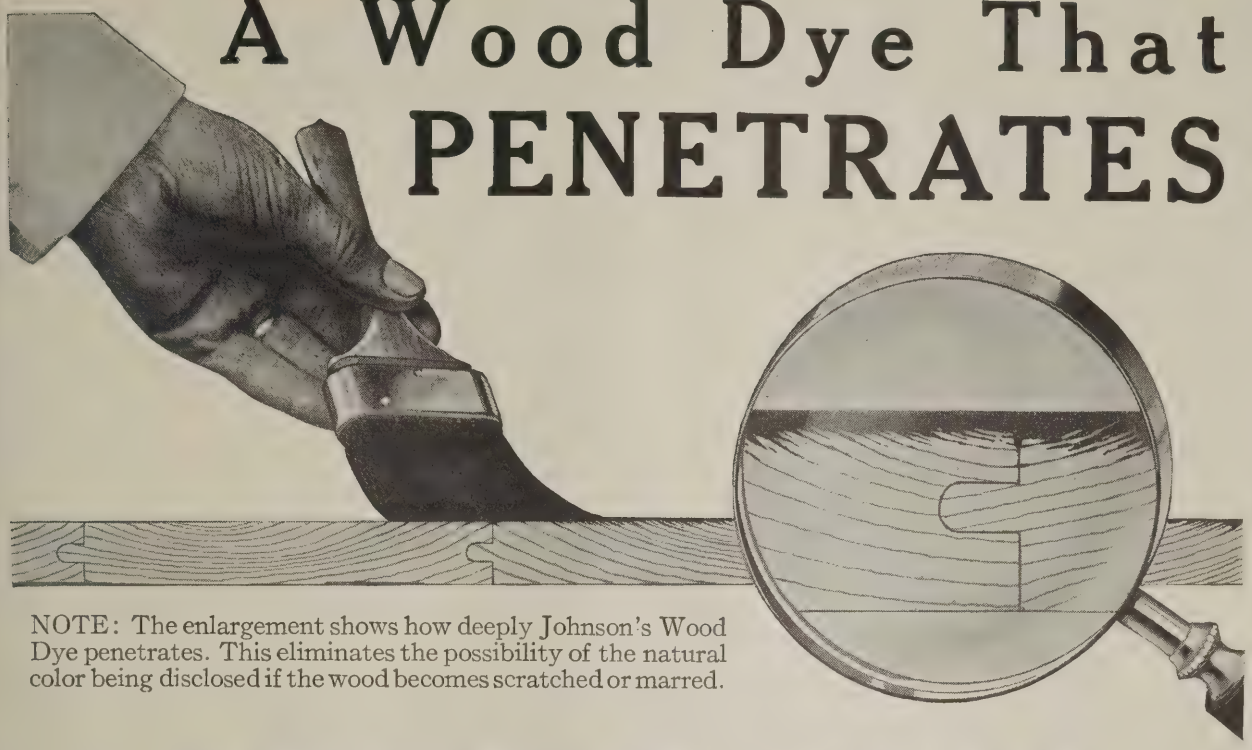
	Shekels
Gazing upon pipe	75
Approaching pipe	25
Hammering pipe	50
Changing hammers	25
Going back for mallet	50
Time of Neriglissar the Repairer of Pipes	100
Time of Labashi the youth	50
Not thought of anywhere else	10
	280

When the King read thereof he sent for Neriglissar, the Repairer of Pipes, and slew him. So there were no more Repairers of Pipes in Mashobam.

Black Mortar Color

120. G. A. D., New York City, offers the following information in answer to inquiry No. 117, published in NATIONAL BUILDER: "In the May number of your journal, L. L. Alston states that he has been unable to get black mortar that will hold its color. I would suggest that he use a liberal amount of dark green pigment in the mix. This has been quite satisfactory in old work. A friend uses oxide of manganese, mixed one point to one bag of cement."

A Wood Dye That PENETRATES



NOTE: The enlargement shows how deeply Johnson's Wood Dye penetrates. This eliminates the possibility of the natural color being disclosed if the wood becomes scratched or marred.

JOHNSON'S WOOD DYE

Johnson's Wood Dye is entirely different from the many wood stains and tints on the market. With it inexpensive soft wood such as pine, cypress, fir, etc., may be finished so they are as beautiful as hardwood. Its brings out the beauty of the grain without raising it in the slightest.

Johnson's Wood Dye is a ***dye*** in every sense of the word. It contains no finish whatsoever and, like most first class products, it answers one purpose only—it dyes the wood—the finish must be applied over it. We recommended Johnson's Varnishes or Polishing Wax.

Johnson's Wood Dye goes on easily and quickly without lap or streak. It dries in four hours and will not rub off or smudge. You will find Johnson's Wood Dye a big help in working out color schemes in stained woods. Johnson's Wood Dye is made in 15 beautiful shades, all of which may be lightened, darkened or intermixed. Full directions on the label.

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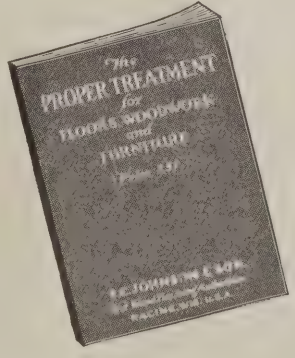
It's the best book ever published on Artistic Wood Finishing—the work of the famous experts—illustrated in color. This book is written for the practical man—it gives covering capacity, includes color charts, etc. We will gladly send it free and postpaid. Use coupon at right.



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Of General Interest

Originator of Skeleton Type Building Dead

JUST as this issue of NATIONAL BUILDER goes to press and as the latest building of the skeleton type, the highest in Chicago—the Chicago Temple building—is being completed, news comes of the death of the originator of the skeleton type building and senior member of the firm of architects and builders who designed the Chicago Temple. William Holabird, of Holabird & Roche, world famous architect, was born September 11, 1854, in New York State. He was educated in St. Paul and at West Point. The first skeleton type of building, which revolutionized the industry, was the old Tacoma building in Chicago completed in 1888. Mr. Holabird also originated the use of subbasement space, a feature of practically all modern skyscrapers in all cities.

Newport News Shipbuilding and Dry Dock Co. Photo

This is not a view of a room in an elite hotel, but of the social hall in the S. S. Leviathan, recently rebuilt and figuring in newspaper reports

S. S. Leviathan Like Big Hotel

NEWSPAPER readers have recently read a great deal about the S. S. Leviathan, which was formerly the German *Vaterland,* interned during the World War and completely remodeled recently by the United States Shipping Board. The reconditioning of this great ship was really a building problem, and a big one at that, for the *Leviathan* is larger than the biggest skyscraper in the world, being 950 feet long, 100 feet wide and has a molded depth of over 70 feet and a draft of 40 feet. The original owners asked $1,000,000 for the plans of the ship, a prohibitive price, so it was decided to make new plans, a job which required two years and the plans made a book of over 1000 pages. The interior of the ship is like that of the largest kind of hotel, therefore the architect and decorator were important factors in the reconstruction of the *Leviathan.*

Residential Building Leads

FORTY-FIVE per cent of all contracts awarded the first six months of this year were for residential buildings, according to the F. W. Dodge Corporation. This is by far more than any other type of building.

P. & A. Photo

Tower of the Chicago Temple Building, 556 feet above the sidewalk, the highest building in Chicago and one foot higher than the Washington Monument, being completed just as the architect of the building died

Photo by Gilliams Service

Strange modern office building in Berlin

Changing Styles in German Buildings

LIKE all other things architecture is being "modernized" in Europe and both office and industrial buildings are being erected in remarkable new styles. The above illustration shows a modern office building in Berlin, recently built from plans drawn by Alfred Gellhorn, considered one of the greatest of architects in modern Europe.

President Bestows Medal on Designer of Lincoln Memorial

AT the recent convention in Washington, D. C., of the American Institute of Architects, the culminating spectacle was the bestowal by President Harding of the gold medal of the institute on Henry Bacon, designer of the new Lincoln Memorial. The President said, in part:

"So, in presenting this testifying medal to you, Mr. Bacon, we would testify also our appreciation and pride in the contributions of those who have been your coadjutors in embodying the substance of ennobling thought, the glory of beauteous conceptions. Out of the crudest materials, you and those

Photo by Underwood & Underwood

The Lincoln Memorial, designed by Henry Bacon

who have wrought with you and after you have given us this creation whose simple grandeur has arrested the eyes and thoughts of whoever loves the beautiful and appealing. You have reared here a structure whose dignity and character have won it rank among the architectural jewels of all time. You have brought to your countrymen a swelling pride in the thought that they have been capable of producing such an inspiring theme and such masterful execution."

No Permit, Contractor Cannot Collect

THE Hanford Construction Company, Duluth, Minnesota, has lost a case against a customer to recover the amount due for work in repairing a building done on a cost-plus basis, because of the fact that no building permit had been taken out for the job. "Just what effect this decision will have on contracts and mechanics' liens on which building permits may have not been obtained is a matter of conjecture," says the Duluth Builders' Exchange, which has taken the matter up with its legal department.

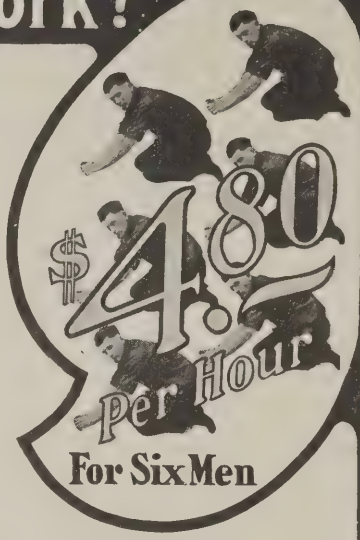
How Much are YOU Paying For Your Floor Surfacing Work?

90¢ Per Hour; More Work and a Better Job The American Universal Way

Why Pay SIX Men When ONE Can Do It?

The Contractor who does his floor surfacing by hand is wasting profits equal to the wages of five men.

In these days of close figuring you can't afford to have six good mechanics doing the work one common laborer can do with the



American Universal
FLOOR SURFACING MACHINE

With the AMERICAN UNIVERSAL FLOOR SURFACING MACHINE a common laborer can surface as much floor in an hour as the six best mechanics on your pay-roll. And he'll do a better job, for the work of the AMERICAN UNIVERSAL FLOOR SURFACING MACHINE is positively uniform—free from all imperfections, chatter marks, etc.

The difference in the cost of the job means a substantial profit on work ordinarily done at small profit or at a loss by hand.

Approximately ninety cents per hour covers the cost of labor, machine, garnet paper and electricity in surfacing floors the AMERICAN UNIVERSAL WAY. Compare that cost with the cost of six of your best men. The difference is profit you should be getting—profit others ARE getting.

Surfacing Floors as a Business

Many contractors who have bought AMERICAN UNIVERSAL FLOOR SURFACING MACHINES for their own work have found it easy to get the floor surfacing work of other contractors in their locality and at profitable prices.

Others have built up a permanent and profitable business by specializing in the surfacing of old and new floors. In either case the sturdy construction of the AMERICAN UNIVERSAL FLOOR SURFACING MACHINE, the high quality of its work and its economy of operation mean substantial profits for its owner.

What the American Universal Will Do

One of the exclusive features of the AMERICAN UNIVERSAL FLOOR SURFACING MACHINE is the elimination of the tilting feature common to other machines.

Our machine rests solidly on its own truck wheels and the cutting depth is easily regulated with a lever on handle of machine. This feature explains why the AMERICAN UNIVERSAL FLOOR SURFACING MACHINE leaves no waves in the surfaced floor. There are many other important features exclusive to this machine; entirely self-adjusting; edge sander drum enables operator to finish floors flush with walls with no hand work; five-day trial offer; positive guarantee, etc.

Write today for prices and complete information on how the AMERICAN UNIVERSAL FLOOR SURFACING MACHINE can cut your pay-roll and increase your profits.

The American Floor Surfacing Machine Co.
Originators of Floor Surfacing Machinery
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City..... State.....

For the Builders' Library

"English Church Fittings, Furniture and Accessories," by J. Charles Cox, LL. D., F. S. A.—The churchyard, monuments within the church, the tower and bells, fonts and font covers, the seating of churches, pulpits and lecterns, screens and lofts, iron-work, armour, royal arms, hatchments, clocks and sand glasses, chained books and church libraries, painted glass, mural paintings, candelabra and cresset stones, organs and other musical instruments, altars, reredoses, altar rails and plate, piscinæ, sedilia, easter sepulchers, almeries, bread cupboards, coffers, alms-boxes, encaustic tiles, and such varia as dog tongs, embroidery, acoustic jars, confessionals and low side windows, biers and coffins, and maidens' funeral garlands, are the subjects discussed in text and pictures. There is no other book we know like it published and it is a valuable adjunct to any architect, builder or furnisher in the designing, construction or furnishing of churches. Attractively printed and bound, size 7x9¼; 320 pages, with numerous photographic illustrations. Published in this country by G. P. Putnam's Sons, New York.

"Progressive Suggestions for Planning Church Buildings"—There are all kinds of "plan books" available to the builder of houses, some good and some not so good. But the number of books showing suggestions for planning and designing church buildings is not nearly so large. The book bearing the above title is one of the best we have ever seen. It is published by The Home Missions Council, 156 Fifth avenue, New York and edited by Rev. Elbert M. Conover, assisted by Albert N. Dobbins, architect. "The purpose of the plans contained in this book," says the editor, "is educative and suggestive. It indicates how architects who know the church and love it and who know the demands made of the modern church have solved some church building problems." The book contains 48 pages, is 8x11 in size and sells for 50 cents.

Two More White Pine Monographs—Numbers 2 and 3 in Vol. IX of the White Pine series of architectural monographs on "The River Towns of Connecticut," with text by William D. Foster, and "Cooperstown in the Days of Our Forefathers," with text by Frank P. Whiting, have recently been issued.

"Foundations, Abutments and Footings" is a book of 412 pages, and is intended to be the first of a series of six volumes designed to provide the engineer in practice and the engineering student with a complete work covering thoroughly the design and construction of the principal kinds and types of modern civil engineering structures. The book is the work of a group of 17 specialists, and George A. Hool, professor of structural engineering, University of Wisconsin, and W. S. Kinne, professor of structural engineering at the University of Wisconsin, are the editors-in-chief. It is intended to present the best ideas in modern

Fig. 29—Showing use of short pile follower, from "Foundations, Abutments and Footings"

practice on such subjects as soil investigation, excavation methods, foundations in wells or pits, cofferdams, open caissons, pneumatic caissons, piles, waterproofing of substructures, retaining wall foundations, dam foundations, machinery foundations, abutments and piers for ordinary and bascule bridges. Especially interesting is the chapter treating with piles and pile driving. The subject is treated in a thorough and practical manner and no attempt is made to develop long or cumbersome formulas. Indeed, it may be said that this is characteristic of the entire work. The book is published by the McGraw-Hill Book Company, 370 Seventh Avenue, New York, and sells for $4.

"Principles and Practices of Up-Keep Painting"—The Paint and Varnish Division of E. I. duPont de Nemours and Co. has just prepared and published a new book under this title. It is a substantial volume of 200 pages, bound in fabrikoid, and its text covers in simple, practical fashion, modern painting practice for all types of exterior and interior surfaces. It has been written, according to the company's announcement, with a special view towards giving practical aid to plant superintendents and others responsible for the maintenance of industrial property and equipment and as a help to architects and engineers, in the protection of new construction. Its special value lies in the fact that it gives briefly and in every-day language, essential information which ought to be known about paints and varnishes, their various qualities and why and when they are suitable for the great variety of plant uses. It also gives a review of modern paint and varnish making, discusses woods and their treatment. the causes of decay, the defects of paints and varnishes, the proper finishes for wood surfaces, the preparation of the surface for painting, general methods of application, and contains a discussion of every phase of the application of surface coverings to metal surfaces. Concrete and cement surfaces are discussed and many data are given on light reflecting finishes for interior walls and ceilings. The chapters on plant standardization systems and on zoning systems for industrial plants contain much information collected by the company in its own survey and research work. There is a rather full discussion of spray painting, its practicability and its applicability to various surfaces. In general the book contains so much data, including facts on rust inhibition, standards for plant practice, and necessary everyday information, that it is expected to be a valuable contribution to paint and varnish literature. Size 6x9; price $2.

"House and Home," by Greta Gray, A. M.—This book is one of "Lippincott's Home Manuals," and is written primarily for prospective home owners and for students and members of study groups, but it is of interest to builders, for it discusses the subject of shelter for human families, from sanitary, economic, social and architectural standpoints. It has chapters on "The Home and the House," the location of the house, plans, materials and construction, plumbing, heating, lighting, etc., with chapters devoted to the farm house and to multiple houses. Illustrated; 350 pages; size 6x8½; price $2.50; published by J. B. Lippincott, Philadelphia.

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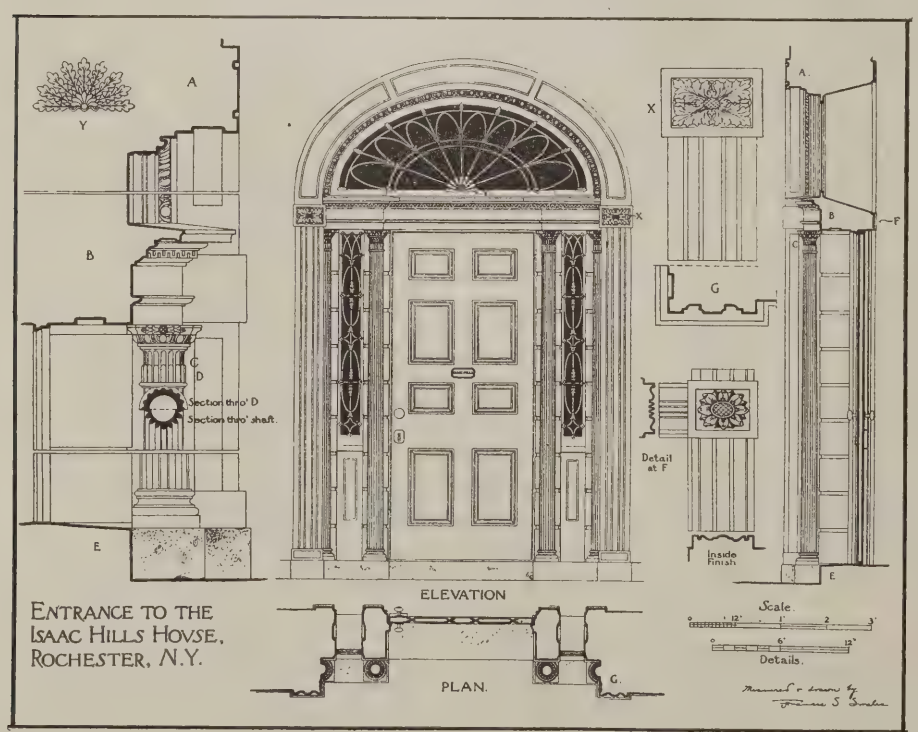
"The Georgian Period," 1923 Edition, by William Rotch Ware. Since 1898, when the editor of *The American Architect* first gathered together a large group of photographs, measured drawings and architectural and construction details pertaining to the best examples of Colonial architecture, as seen in this country, this monumental work has been one of the most important sets in the library of every architect and builder of standing in the country. The 1923 edition has been completely rearranged and reprinted with text matter and indexes condensed into one bound volume. Alphabetical, chronological, geological and text matter indexes have been added, together with a complete list of contributing architects and draftsmen. Five portfolios are devoted to plates and measured drawings which form a large portion of the plate section. Nothing that care and skill can do has been spared to make these drawings useful and thoroughly practical for the decorator and architect. They cover in faithful detail every important element: porches, porticoes, dormers, roofs, gables, interior staircases, proportion of openings—in fact, all essentials of the many subjects treated have been correctly recorded. The loose-leaf arrangement permits the architect to work with freedom on any specific subject. Excellent printing on extra heavy coated paper also adds to the usefullness of these drawings. Full-page half-tone reproductions give to this work a reality of inestimable value. The subjects pictured represent the fine examples of Colonial work executed in New York, Pennsylvania, South Carolina, Maryland, and the New England States during the latter part of the eighteenth and early nineteenth centuries. These plates form a necessary adjunct to the measured drawings. The text matter is permeated with the flavor and spirit of Colonial times. It will give the reader an admirable idea of the social, political and pecuniary conditions that encouraged the construction of such interesting civic and private buildings. As a setting for incidents in Colonial history, this text matter is not only consistent but necessary in order that the architect may fully undersand the meaning and spirit of this important period. Illustrations, both in line and in half-tone, further enhance the value of the text matter. Some of the original articles written by such distinguished authorities as Claude Fayette Bragdon, Olof. Z. Cervin, George Clarence Gardner, C. R. S. Horton, E. Eldon Deane and many others are reproduced in their entirety. The portfolios are 11x14 in size, with handsome brown board covers, with cloth backbone and corners; price of set postpaid, $60. Published by U. P. C. Book Co., Inc., 239 West 39th street, New York City.

A Series of Plan Books has been issued by J. W. Lindstrom, architect, Minneapolis, entitled, "Bungalows," "Cottages and Semi-Bungalows," "Two-Story Homes," and "Duplex and Apartment Houses." Each contains 64 text pages, showing plans and designs, some illustrated in color. The books are 7½x10⅜ in size and sell for $1 each.



Example of architectural details from "The Georgian Period," 1923 Edition. Published in one bound book and five portfolio volumes

"A Symbol of Safety," by Harry Chase Brearley—The subject of this book is "An Interpretative Study of a Notable Institution Organized for Service—Not Profit." It is a discussion of the need for and the operation of that unusual organization well known to all manufacturers of building materials, accessories and equipment, and to all contractors, architects and builders using their products—the Underwriters' Laboratories, Inc. The significance of the label of this organization on any product is explained and how the label is won. We read about "fighting fires that are not prevented"; building to last, not to burn; safeguarding "the universal servant" (electricity); hazardous gases, chemicals, etc.; making burglary more difficult; and the safety of cars and their passengers. In the back of the book are appendixes containing standard specifications for fire tests and classification of building materials and construction, a tabulated summary of column investigation results, etc. A very interesting book; attractively bound; 289 pages; size 6¼x9¼; published by Doubleday, Page & Co., Garden City, New York City.

"Estimating the Cost of Buildings," by Arthur W. Joslin—A thorough and clearly presented system for figuring the actual cost of all kinds of residential work and schools, banks, hospitals and other public buildings of moderate cost. The special forms which the author, who is a building estimator and contractor finds indispensable in keeping accurate record of time, material, and tools in his system of executing building contracts are illustrated and their uses explained. An excellent method of estimating alterations and remodeling, with costs from jobs where careful records of expense were kept, adds to the value of the book. Third edition, revised and enlarged; size 6x9; 212 pages; price $2.50; published by U. P. C. Book Co., Inc., 239 West 39th street, New York City.

"A Manual of Concrete Masonry Construction"—Architects, builders and contractors have long wanted a comprehensive, yet practical, book on the use of concrete building units—a book which would tell how to distinguish well-made units and how to use them. Such a book has now been published by the Portland Cement Association in "A Manual of Concrete Masonry Construction." It contains many excellent illustrations of construction details, the tables of manufacturers of block and tile machines together with shapes and dimensions of units made by them, and the specifications for concrete block and tile and portland cement stucco. It is a 32-page book, of letter size. Copies may be obtained free by addressing the Portland Cement Association, 111 West Washington street, Chicago.

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on Residence of Mr. C. J. Dingfelder, Bogota, N. J.
Herman M. Sohn, Architect

THE swing back to the metal roof is proof that people are building and buying with an eye to getting their money's worth.

A Copper roof is profitable to both builder and home-buyer. A Copper-roofed house, which means a house that is distinctive and attractive in any neighborhood, brings a price that more than repays the builder, and the buyer gets a repair-proof job that makes his purchase a real economy.

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To meet the demand from builders and contractors for literature they can hand or send to prospects, we have just reprinted the book "Copper, the Ideal Roof," which reminds people of what so many always have known about the beauty and durability of Copper and points out the great economy of the Everlasting Metal.

These booklets are supplied to you free of charge, with your name imprinted. Order as many as you can use.

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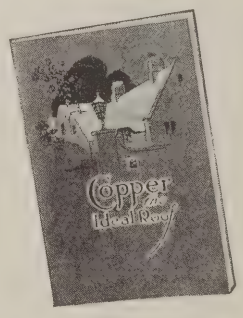

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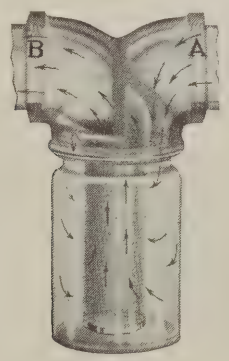
Visible Strainer for Pumps

WATER from city water supply systems is filtered before it is pumped into the mains, but country and suburban home owners getting their water from wells, cisterns, lakes, streams and other private sources need their own device to rid the water of foreign substances. Most pump troubles are due to foreign substances getting into the operating mechanism of the pumping equipment, causing unnatural wear and rapid loss of efficiency, as well as preventing the pump valves and other close working parts from functioning. A new strainer that is visible and that cleans the water will, it is claimed, eliminate most of the trouble connected with pumping equipment. It is installed anywhere on the suction pipe, generally close to the pump. Its construction makes cleaning it easy, the manufacturers state. The head is made of metal and divided into two compartments, into one of which a cylindrical bronze gauze strainer is inserted. Into this head is screwed a glass container, or jar, or trap. A gasket between the glass container and metal head insures a tight fit so air will not leak in nor water leak out. There are no working parts. In operation the incoming water flows through one side of the divided head, then down into the glass jar, then



Phantom view of visible strainer showing water entering at "A," then passing into glass jar, then through bronze gauze strainer and "B" into pump

through the strainer, then through the other side of the head and on into the pump. All openings have ample area, it is claimed, for up to a 2-in. pipe capacity, so there is no unusual effect on the operation of the pump, nor noticeable extra load or friction. A point emphasized by the manufacturers is the fact that the strainer is visible and it can plainly be seen when in need of cleaning. The strainer is manufactured by the Dual Automatic Valve Co., Rock Island, Illinois.

One-Man Portable Gasoline Hammer Drill

A GASOLINE impact drill of the air hammer type is now manufactured by the Pennsylvania Gasoline Drill Co., Land Title Building, Philadelphia, Pennsylvania. It has a self-contained gasoline engine making its own power, therefore no other power equipment has to be transported with it. The complete unit weighs about 70 pounds.

It is particularly adapted to such work

Complete gasoline driven drilling unit in operation. Various tools—spades, tampers, etc.—are furnished with it

as cutting asphalt, breaking concrete bases, picking frozen earth and tamping back fill. The mechanical principle of this gasoline hammer drill combines the action of an air hammer and a gasoline engine in such manner that the drilling unit has but two moving parts, the hammer piston and the fly wheel assembly. No crank shaft or connecting rod is employed and there is no spring or other yielding member used in the internal construction. No inlet or exhaust valves or cam shafts are used, as the air and gas passages are fixed ports, cut through the solid steel of the cylinder.

The down or power strokes of the hammer piston, it is claimed, are made with approximately 900 pounds of gasoline explosive force thrusting it forward to hit the drill bit with terrific force. The flywheel is employed only to return the hammer piston on the upward or compression strokes. Approximately 1800 impacts are struck each minute. For carburation, a gasoline mixing valve is used which permits the drill to be worked at any angle. While the drill continues to run at full speed, the operator shifts it from one position to another and to any desired angle without affecting its operation. To start the drill, the operator gives the rim of the fly wheel a pull by the hand, and even in the coldest weather, it is claimed, the engine starts "with consistent regularity." Lubrication of all parts of the drill is by the means of scoops, fixed to the hub of the fly wheel, which, in turn, runs in a reservoir of oil and delivers a copious supply to all moving parts. A pint of oil will lubricate the drill for a week. A four or six dry cell battery is used for ignition.

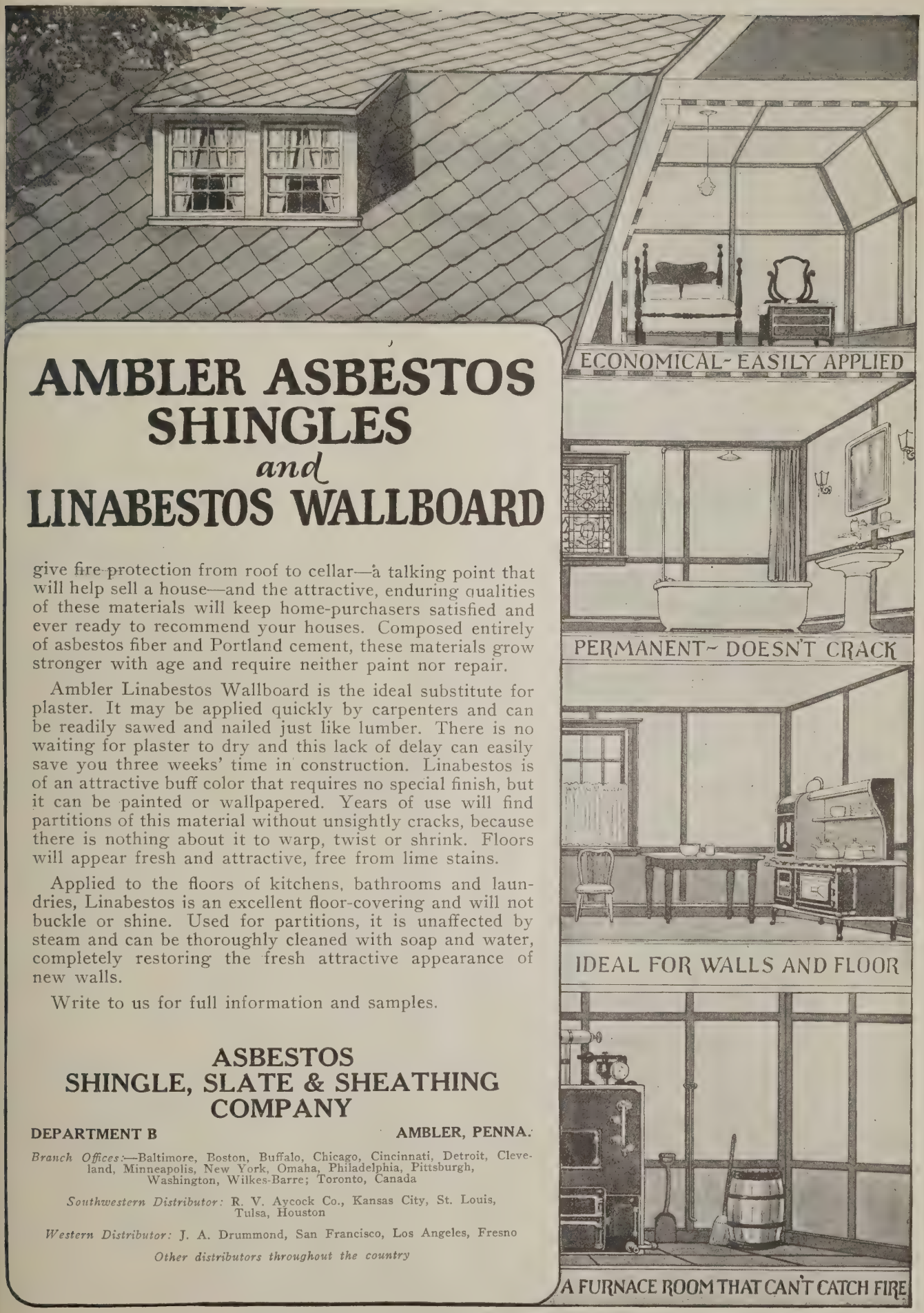
Colormix—A New Colored Concrete Hardener

WHAT is claimed to be a brand new principle in coloring cement is employed by the Master Builders Company, Cleveland, Ohio, inventors and manufacturers of "Colormix," a product recently announced to the building trades for coloring, hardening and waterproofing concrete floors.

This preparation is marketed as a paste with about the consistency of white lead. When put into use it is dissolved in the gauging water, where it dyes every particle of sand and cement of the floor topping a deep rich color. Its coloring, waterproofing and hardening functions are not limited merely to the surface of the floor, it is claimed, but act uniformly and evenly throughout the entire topping layer, from the upper one-half to three-quarter inch of the floor.

A smooth finish with a lasting luster is produced in tile red, linoleum brown, nile green, battleship gray, buff and white. Combinations of these colors may be laid in a variety of designs to fit any decorative scheme. When the Colormix floor is troweled it is ordinarily cut into squares to resemble tile, the size of the blocks varying from 6 in. to 18 in. square, to suit the tastes of the owner and his architect. Colored cement tile employing this new compound in the above colors are made in regular sizes, 6x6 in., 6x9 in., 9x9 in., and larger, and are laid like quarry tile.

The cost of a Colormix floor, the makers claim, is very little more than that of an ordinary concrete floor, and the installation can be made without difficulty by following the specifications furnished by the manufacturer.



AMBLER ASBESTOS SHINGLES *and* LINABESTOS WALLBOARD

give fire-protection from roof to cellar—a talking point that will help sell a house—and the attractive, enduring qualities of these materials will keep home-purchasers satisfied and ever ready to recommend your houses. Composed entirely of asbestos fiber and Portland cement, these materials grow stronger with age and require neither paint nor repair.

Ambler Linabestos Wallboard is the ideal substitute for plaster. It may be applied quickly by carpenters and can be readily sawed and nailed just like lumber. There is no waiting for plaster to dry and this lack of delay can easily save you three weeks' time in construction. Linabestos is of an attractive buff color that requires no special finish, but it can be painted or wallpapered. Years of use will find partitions of this material without unsightly cracks, because there is nothing about it to warp, twist or shrink. Floors will appear fresh and attractive, free from lime stains.

Applied to the floors of kitchens, bathrooms and laundries, Linabestos is an excellent floor-covering and will not buckle or shine. Used for partitions, it is unaffected by steam and can be thoroughly cleaned with soap and water, completely restoring the fresh attractive appearance of new walls.

Write to us for full information and samples.

ASBESTOS SHINGLE, SLATE & SHEATHING COMPANY

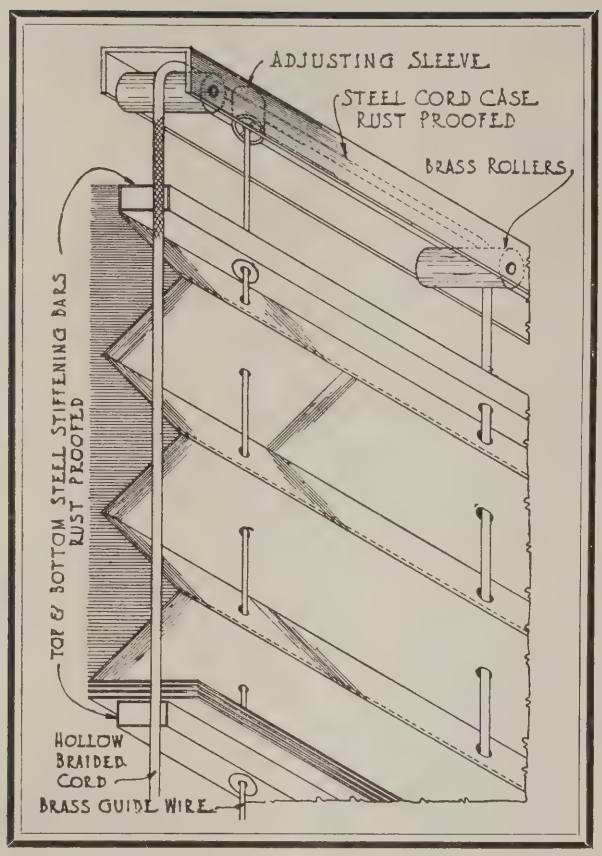
DEPARTMENT B **AMBLER, PENNA.**

Branch Offices:—Baltimore, Boston, Buffalo, Chicago, Cincinnati, Detroit, Cleveland, Minneapolis, New York, Omaha, Philadelphia, Pittsburgh, Washington, Wilkes-Barre; Toronto, Canada

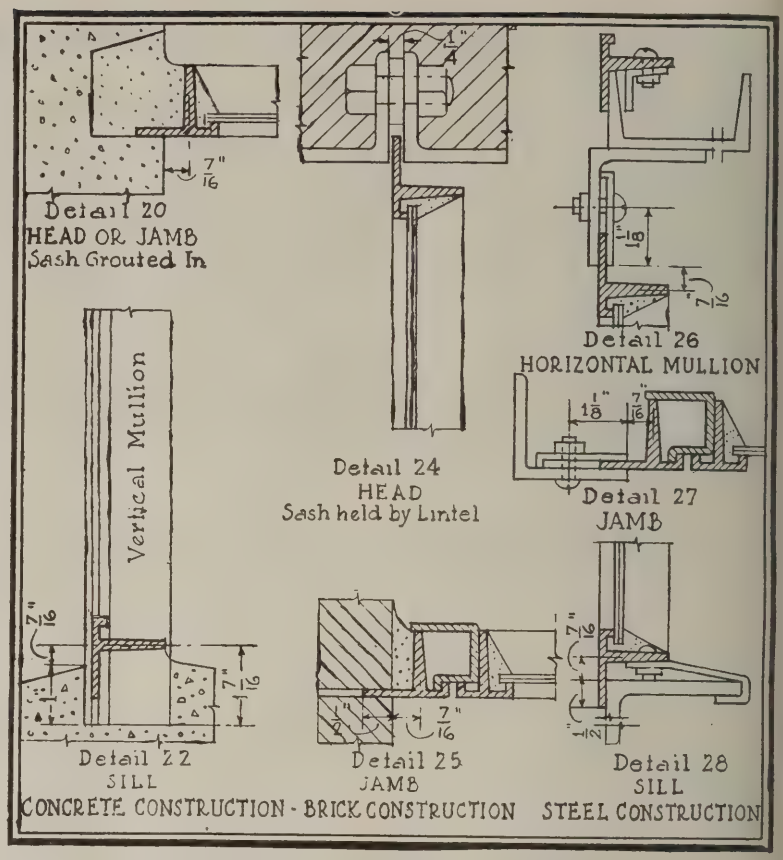
Southwestern Distributor: R. V. Aycock Co., Kansas City, St. Louis, Tulsa, Houston

Western Distributor: J. A. Drummond, San Francisco, Los Angeles, Fresno

Other distributors throughout the country



Accordion plaited shade, showing operation



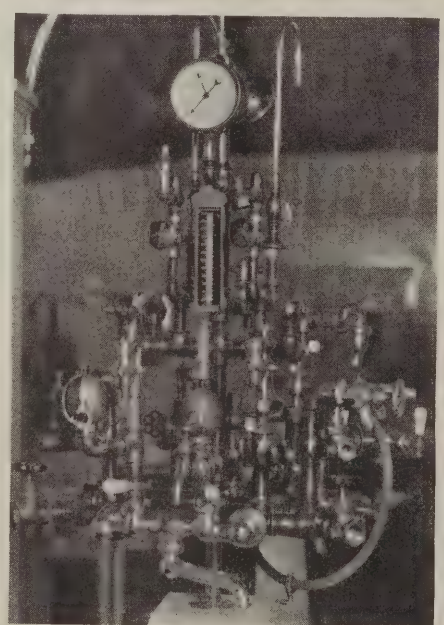
Installations of "top sliding" steel sash

Year 'Round Shade for Schools and Other Buildings

PROPER shading for large windows in schools, hospitals, office buildings, banks, hotels, shop windows, factories, residences, etc., is sometimes a difficult problem to solve. The Athey Co., 6035-6045 West 65th Street, Chicago, manufacture a shade for year 'round use that has many interesting features and is applicable to practically any type of window.

The shade is gravity-operated without spring roller, pawl or notch. It is adjustable from either top or bottom, giving absolute light control. The brass guide wires prevent the blowing of the shade when windows are open for ventilation, a feature of special importance on casement, counterbalanced or other windows of unusual design. The standard material is translucent. It eliminates all glare while permitting the entrance of a soft diffused working light preventing eye strain. Awnings are usually unnecessary when this shade is used.

The cloth of which the shade is regularly made is a herringbone weave coutil, thoroughly shrunken to prevent binding on guide wires and also protecting against damage by rain if a window is left open, and is well calendered, the surface being smooth and dust resisting. The 1⅝-in. accordion plaits are stitched on each side so that the shape is held and the shade always folds evenly. The cord case at head, in which are the full length brass rollers, is of No. 16 gauge steel, rustproofed and very rigid. The shade can be made any width up to 16 ft. and of any height.



This "family tree" of plumbing fixtures, containing more than half a hundred different units, was a feature of the exhibit of the Copper and Brass Research Association at the recent convention in Atlantic City of the National Association of Master Plumbers. A piece of copper pipe 5400 years old from ancient Egypt was also on display

Up from the bottom or down from the top controlled by hollow braided cords, the cord at right side controlling the bottom of the shade while the left cord controls the top. Its simplicity of construction and its ease of operation make it, the manufacturers claim, the most durable shade on the market, and many users testify to its being *the cheapest shade that can be bought* when length of service is considered.

"Top Sliding" Steel Sash That Permit 100 Per Cent Ventilation

STEEL sash permit the use of various types of ventilators, but one particularly worthy of notice is that manufactured by the Bogert & Carlough Co., Paterson, N. J., and known as the "Boca Top Sliding" sash. The ventilator is so constructed that when opening, the head of the ventilator slides in the plane of the sash while the sill of the ventilator swings outward. The head is hinged on bronze slides which move up and down in the groove formed by the channel weatherings. This permits the entire window opening to be ventilated, thus 100 per cent ventilation is assured. The weight of the ventilator is carried by side arms so accurately, it is claimed, that at slight effort it can be opened to any degree. This type of sash does not project inside the window. It permits the use of shades and screens in schools, hospitals, office and public buildings.

Today

APPROVED BY THE TRADE MARK H.M.R. ESTABLISHED 1868 UNDERWRITERS LABORATORIES

"They Grow More Beautiful with Age"

TODAY—just as it has been for the past twenty-three years—architects, contractors, builders, roofers and home owners who appreciate values, continue to specify Reynolds Shingles.

The difference in cost between Reynolds Shingles and others will average only $8 to $9 for the entire roof.

Consequently, to specify Reynolds Shingles is to practice economy, as Reynolds Roofs are ***unconditionally guaranteed for ten years*** against curling or other defects.

It's all in the way Reynolds Shingles are made. The use of the finest materials and the knowledge of asphalt shingle making, insure a perfect product.

For every roof—specify Reynolds. There is no substitute. The trade-marked package and the shingle's saw-tooth edge are your protection.

Send for Samples

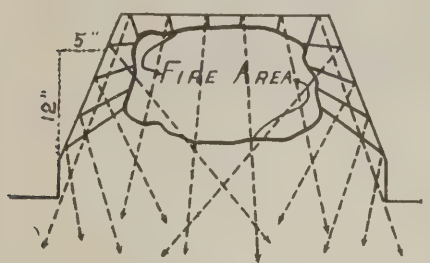
H. M. Reynolds Shingle Company

Grand Rapids, Michigan

"Originators of the Asphalt Shingle"

Advise Standardized Wall Angle for Fireplaces

THE Donley Brothers Co., East 74th Street and Aetna Road, Cleveland, have issued a 16-page publication, size 6x9, called the "Donley Book of Fireplaces," which has some interesting and practical suggestions to make concerning the proper designing and construction of fireplaces. Primarily it contains a plea for standardization of the side wall angle of the fireplace, because a



Illustrating heat radiation from a fireplace having side and rear walls at an angle of five inches to the foot, beginning one course of brick back from the mantel front

proper fit of damper and fire basket can only be secured when the wall angle is shaped with reference to these accessories. An inward splay of 5 in. to the foot is recommended as the standard wall angle which combines ample fire capacity with maximum radiation. "This angle," to quote from the booklet, "was selected after consultation with many successful fireplace builders and the examination of hundreds of plans, as well as much practical experiment. It represents a wide consensus of opinion."

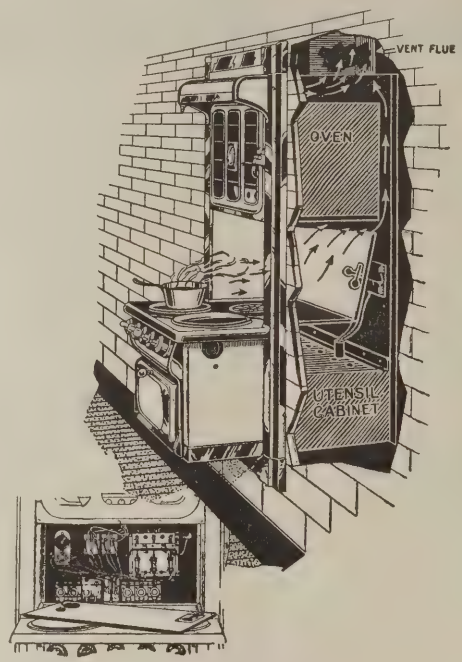
In addition to this practical discussion of correct fireplace construction, the booklet also contains a resume of the history of fireplace traditions and a series of suggestive sketches dealing with beautiful exterior designs, showing brick, stone and stucco treatments as well as tile and wooden mantel fronts. A plan sheet folded in the center of the book gives a suggested profile, plan and elevation, with a table of dimensions showing how height, width and depth should vary in relation to each other, as well as damper and flue sizes for each combination of dimensions. The booklet concludes with descriptions of dampers, fire-baskets, ash dumps, ash pit doors, etc., which the Donley Brothers Co. manufacture and sell.

"Through the Ages"

THIS is the title given to a new monthly publication issued by the National Association of Marble Dealers, Gay and Water Sts., Baltimore, Md., subscription price $3.00 per year, or single copies 35 cents. It is "a monthly magazine devoted to the uses of marble—its universal adaptability, beauty, permanency and economy." The journal is beautifully printed in sepia on egg-shell stock, and generously illustrated from photographs. The articles are mainly about both ancient and modern buildings of marble, and about the quarrying and marketing of "the stone of ages." The magazine is 8½x11 in size and runs about 40 pages of reading matter.

Built-in Stove Is Newest Space Saver

THE Standard Electric Stove Co., Toledo, Ohio, have developed a type of electric range which contractors and builders will find of great appeal to their women customers. It is a built-in stove and as such



A built-in electric stove

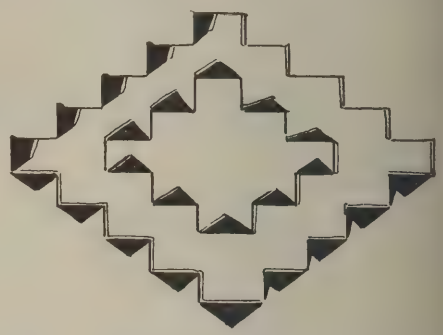
takes up no floor space, permitting easy cleaning beneath it, and at the same time it becomes an important means of ventilation for the kitchen. These built-in models are mounted in a wall box, provided with suitable flanges which fit closely to the partition or outside wall of the room. The wall box has a vent flue in the top which may be connected with wall pipe between the studding to a chimney flue, or in the case of an outside wall no flue connection is required other than the ventilating cap. The carpenter work incident to installing the stove is the same as is required to cut in a window frame. Three different sizes of stoves of this type are described in the manufacturers' catalog, which also displays their many other types of electric stoves, water heaters and other appliances.

Under New Management

THE Standard Scale and Supply Corporation, 1631 Liberty Avenue, Pittsburgh, Pa., has purchased and is now operating under entirely different management the business formerly conducted by the Standard Scale & Supply Co. The new corporation, it is announced, will manufacture the highest grade scales, concrete mixers and contractors' equipment.

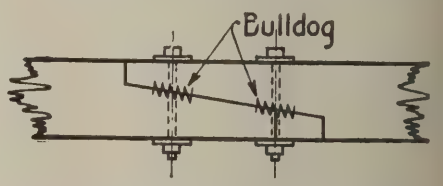
"Bulldog" Timber Joint Plates

A SMALL cold rolled steel plate provided with numerous sharp, strong teeth, biting in both directions, with a hole in the center through which the bolt is inserted and known as a "Bulldog," is manufactured by the Midwest Steel & Supply Co., Inc., 28 West 44th Street, New York, for all kinds



Plate, with teeth, used in all kinds of timber joints

of timber joint plates—scarf joints, tie joints, dapped joints, post connections, fish plate joints, lap joints, brace joints, bridge stringers and ties, girder supports, compound beams, arch centering, etc. When the nut on the bolt is tightened the teeth cut into the wood evenly and easily on both sides, it

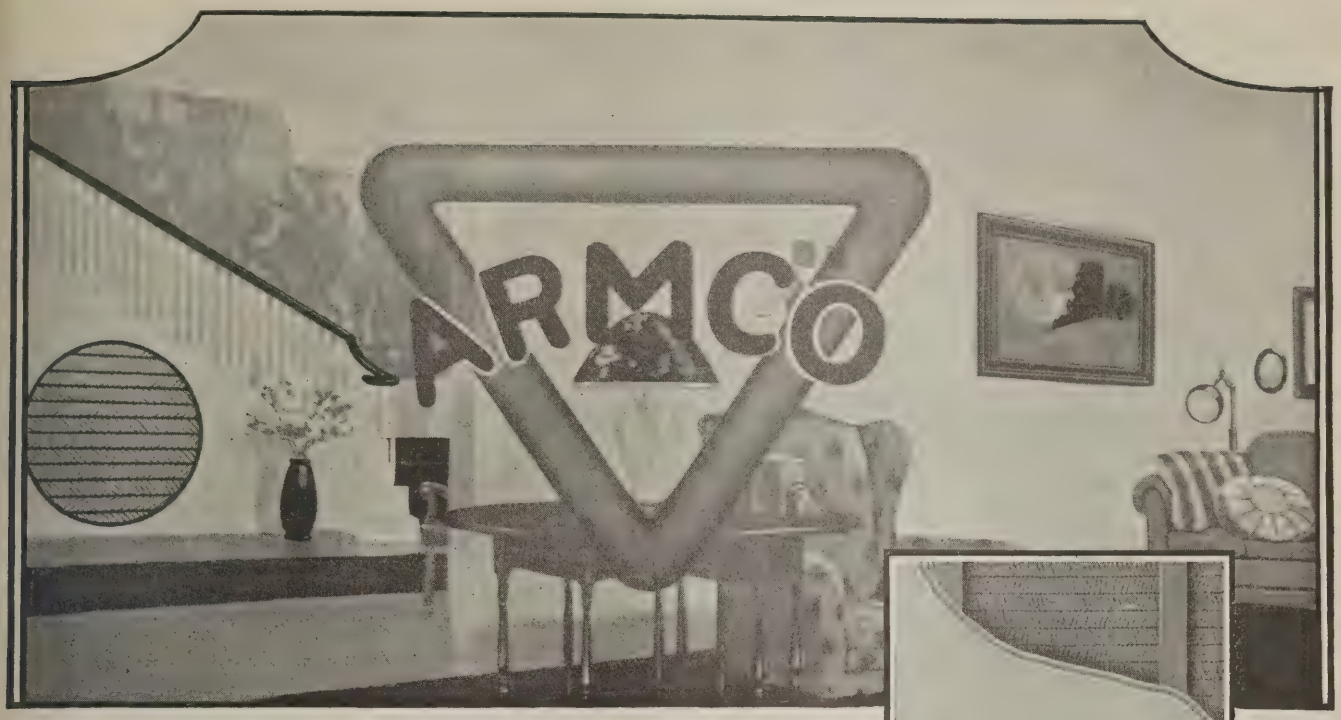


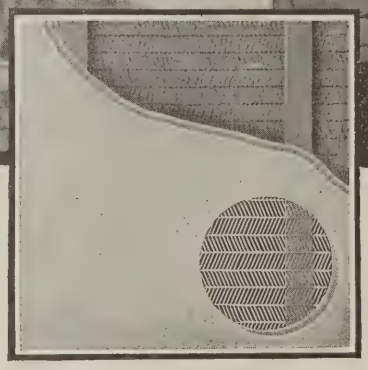
Showing use of plate in a scarf joint

is explained, and a firm connection is insured. The device overcomes the splitting around bolt holes and holds timbers together if there is any shrinkage in the connections. Washers under the nuts are recommended. The "Bulldogs" are approximately 4x4 in. in size, each has 56 teeth—28 pointing to each side—and standard bolts from ½-in. to 1½-in. diameter can be used.

A Washable, Flat Interior Finish

HOW to freshen up old walls without papering them, or what treatment to give new walls that will suit the tastes of most tenants is a problem frequently confronting the professional builder. A washable, flat wall finish, as a rule, answers the purpose. Adams & Elting, 1833 Seward Street, Chicago, describe the merits of their "Naples Velvet Finish" in a convenient, attractive little book profusely illustrated in colors and with a centerspread of color samples that is of practical help in choosing the tone of finish desired. Specifications and directions for applying the finish are also given. The booklet is sent free on request.





Herringbone the Only Armco Lath

Armco Ingot Iron sheets expanded into Herringbone, provide for this superior metal lath a durable and flawless base, 99.84% pure iron—qualities which identify Armco the world over.

Herringbone, a rigid, self-furring metal lath, becomes an integral part of the plaster, preventing cracks and affording a fire-safe protection for wood studding construction. With Armco Ingot Iron as a base, all chance of deterioration is eliminated.

Leading architects and builders realize the economy of the Herringbone-Armco Metal Lath. They specify it for strength and permanence.

Other GF Materials

Self-Sentering—A combined form, lath and reinforcement.

Trussit—A reinforcement for solid partitions.

GF Expanded Metal—A concrete reinforcement.

GF Steel Tile—For concrete floors.

GF Steel Lumber—Used in place of wood joists and studs.

GF Steel Channels—Studding for solid partitions.

GF Peds—Spot grounds for attaching trim to concrete and plaster.

GF Waterproofings—For concrete and masonry.

Write for illustrated literature.

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Herringbone
Rigid Metal Lath

THE GENERAL FIREPROOFING CO., *Youngstown, Ohio*

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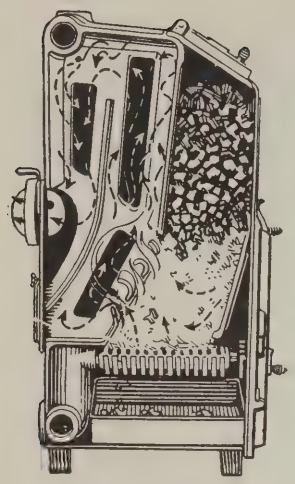
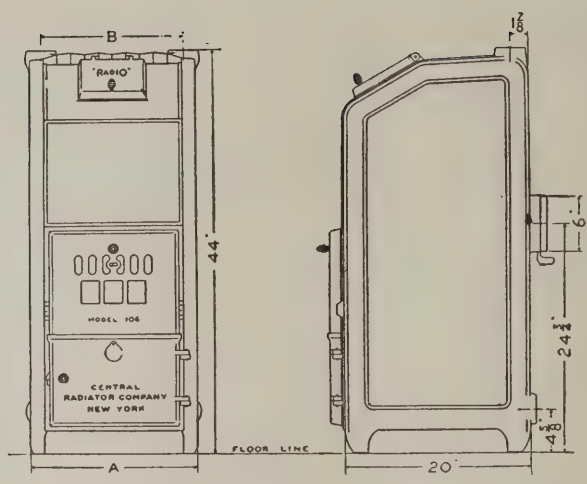


Fuel feeds automatically into the fire. "Down-draft" prevents escape of heat in smoke and ashes



Showing front and side views. The "Radio" heater is made in five sizes

Open Hearth and Hot Water Radiator Combined

WHAT should prove a very popular heating equipment for small or moderate sized houses, especially those without cellars, whether new or old, for bungalows, farm houses, stores, garages, etc., has recently been announced by the Central Radiator Co., 41 East 42nd St., New York. This equipment is known as the "Radio" hot water radiator, and it is characterized as being a combined open hearth and hot water radiator. The makers state that it gives to every room in the house its full share of hot water heat at less cost than heating one room with a stove. It is installed in any room having a chimney and connected by small piping to ordinary hot water radiators in adjoining rooms. It has a fuel reservoir which holds the fuel for long periods, burns hard or soft coal, coke or wood, and feeds the fuel downward automatically into the fire, relieving the housewife from the drudgery of frequent firing. It is constructed on the downward draft principle, which consumes much of the smoke and gases from the combustion chamber.

Combine Six Catalogs in One Binder

COBURN Trolley Track Mfg. Co., Holyoke, Mass., makers of a diverse line of building hardware and fireproof equipment, have done a sensible thing in issuing separate catalogs on their various products so as to serve the individual inquirer not interested in the entire line, and at the same time make it possible for the customer with all their catalogs to keep them together. This has been accomplished by printing all the catalogs in the same form so that they can be combined under one cover, which is a loose leaf binder. The component parts of the big books are: Catalog No. 55, Patent Rolling Ladders; No. 60, Overhead Carrying Systems for both "Round Trough" and I-Beam; No. 61, Fireproof Doors and Hardware; No. 62, Kalamein Doors and Details; No. 110, Sliding Door Hardware, and No. 120, Sliding Door Hardware for Residences, Schools and Public Buildings. All save the last are 8½x11 in size and are punched to fit the same binder.

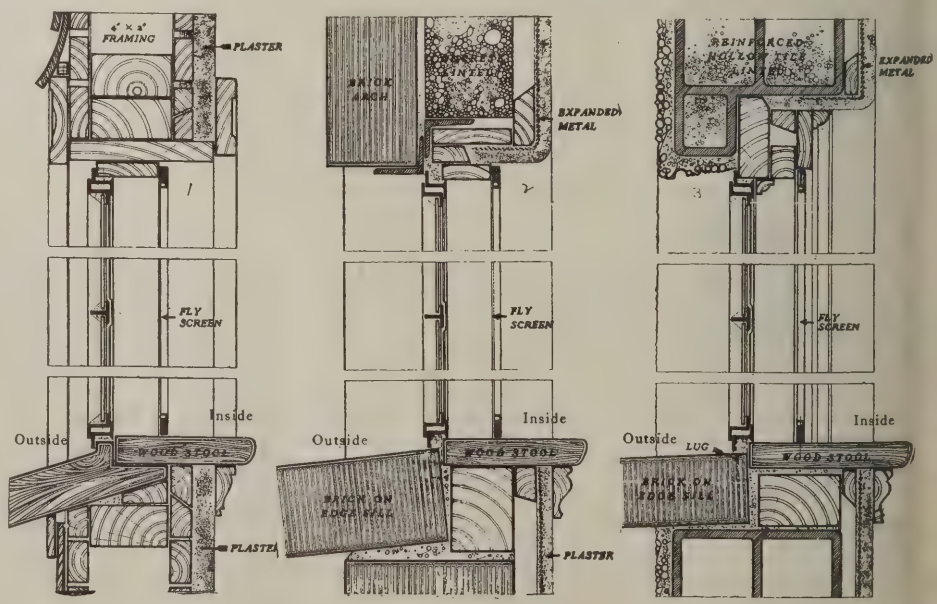
Standard Steel Casements for All Types of Construction

STEEL casements give distinctive architectural lines to houses and apartments which cannot be obtained by any other windows. They are daily growing in popularity and acceptance, and it is well for the contractor and builder to know something about the standard types and sizes of steel casements and their installation. Henry Hope & Sons, 103 Park Avenue, New York City, show how their sash are applied in walls of different construction in a pamphlet containing the three illustrations reproduced here. These sash are delivered ready for fixing into the building as a complete unit, with casements hung and complete hardware attached. It is stated that any man who can use a screw driver can install them satisfactorily. No labor is required other than fixing the complete window and glazing.

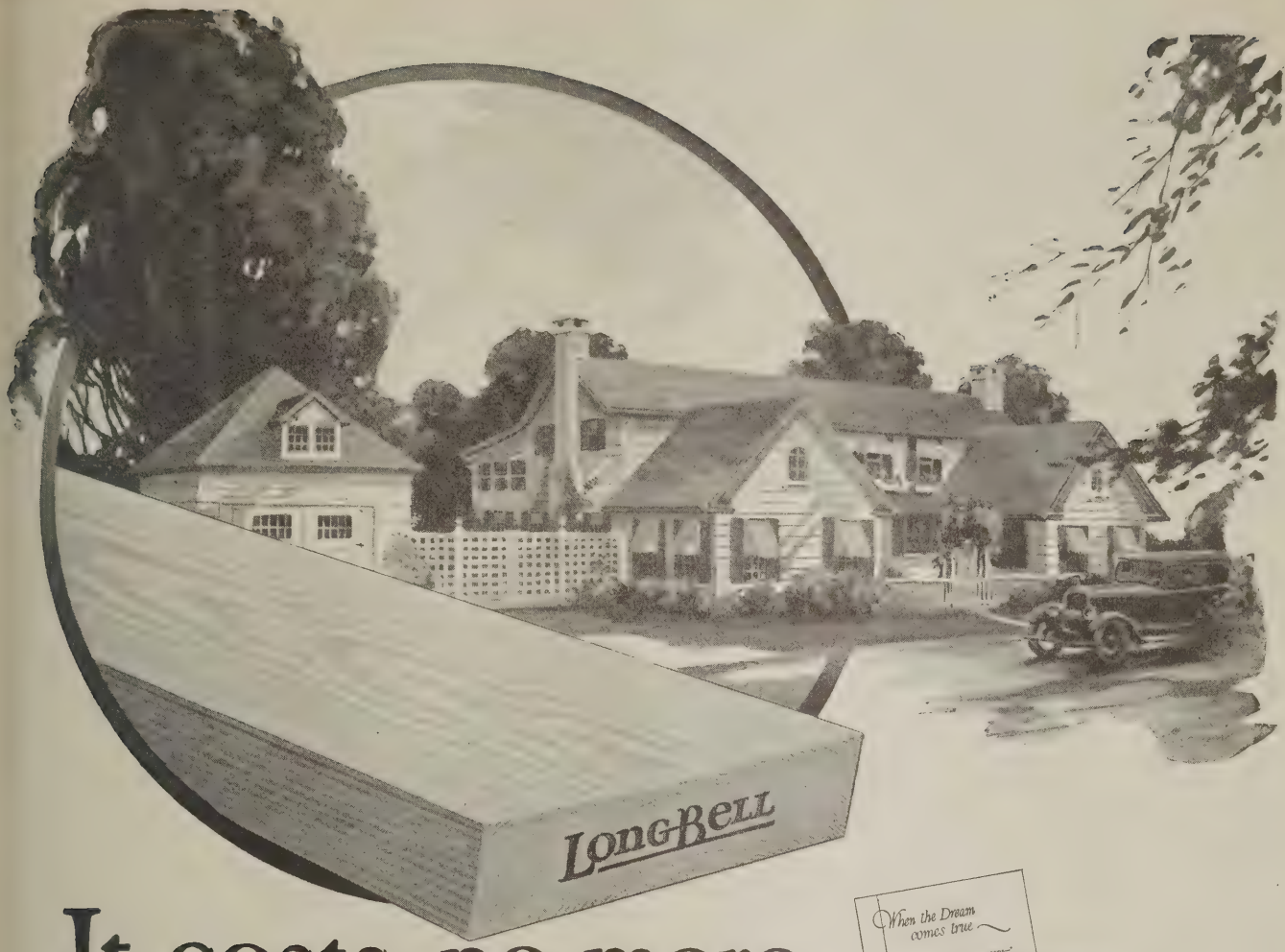
Standard sizes in the Hope steel casements have been arrived at by making every window a multiple of a well-proportioned pane, with the result that variation in glass sizes is reduced to a minimum. All joints are electrically welded and the fittings, hinges, etc., are riveted. The fittings allow for a wide range of ventilation, from an opening of about an inch to a right angle.

"Vitrifyx" for Concrete Floors

CONCRETE floors have so many advantages that they are fast coming into general use. They have disadvantages, however, which, unless provided against, seriously affect their value. The Vitrifyx Co., 2526-34 West Congress Street, Chicago, manufacture a product which they claim densifies, hardens, dustproofs, oilproofs and waterproofs concrete floors, making them serviceable for the hardest usage. "Vitrifyx" is a clear liquid chemical which penetrates the concrete. Through its chemical properties it is said to attack and change the lime of the cement, converting it into an insoluble silicate, hardening and welding together every particle of the concrete and producing an impervious, semi-glazed surface which resists wear and disintegration. The preparation, it is claimed, can be applied at the rate of 5000 sq. ft. a day per man, by merely flushing over the surface and spreading with long handled brushes or brooms. One gallon covers 70 to 100 sq. ft.



Frame and shingle walls. Solid brick or stone walls. Hollow tile and stucco walls Application of standard steel casements to various types of construction



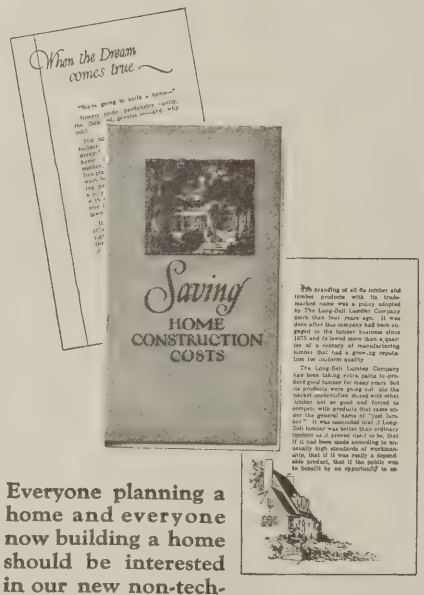
It costs no more to build wisely

MANY people seem to think that lumber is *just lumber*, and that the lumber to use in their homes is the kind which costs the least.

Fortunately, contractors, builders, carpenters and architects know there is a difference in lumber, and that inferior lumber, poorly manufactured, is costly in the long run.

Lumber, identified by the Long-Bell trade-mark, can be selected with the assurance that it is a dependable product of uniform quality. Its use reduces repair bills to a minimum and, because of its painstaking manufacture, it can be put into construction with a minimum of carpenter labor.

Long-Bell Lumber is identified by the Long-Bell trade-mark on the end of the piece.

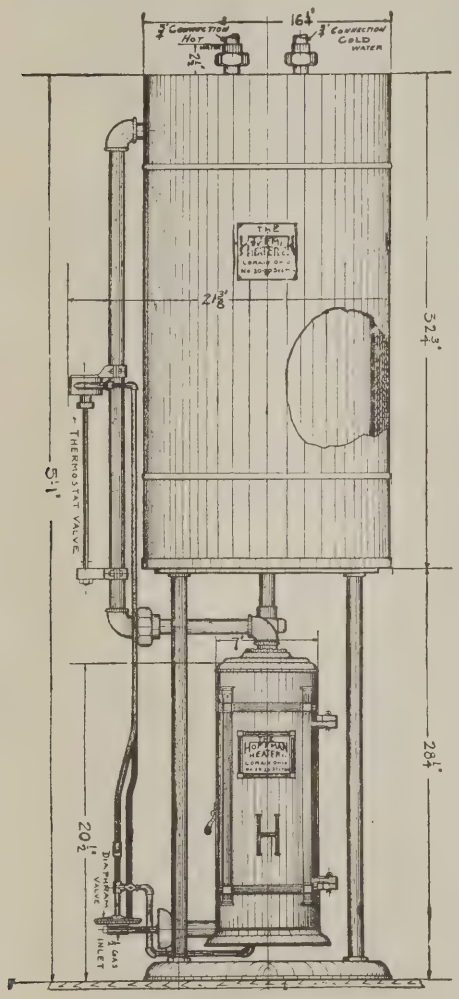


Everyone planning a home and everyone now building a home should be interested in our new non-technical booklet, "Saving Home Construction Costs"—a valuable contribution to building information. Send for your copy.

The Long-Bell Lumber Company
603 R. A. LONG BUILDING KANSAS CITY, MO.
Lumbermen since 1875

Flow-Line Control for Hot Water Storage System

HOT water always on tap is one of those "modern conveniences" which cannot comfortably be done without in the modern home. The Hoffman Heater Co., 253 Oberlin Avenue, Lorain, Ohio, makers of a large line of automatic water heaters, have embodied special features in a new safety control for hot water storage systems for residences, industrial and commercial uses,



The tank with suspended heater below. Note the thermostat valve on the flow line

adaptable to any water or gas conditions, which possesses interest to the professional builder.

These systems are a complete assembled unit comprising a 20 and 40-gallon extra heavy galvanized tank supported upon a suitable stand with special heaters suspended directly below. In operation the heater supplies hot water to the tank through an outside flow-line, which enters the boiler about four inches below the top. Superimposed upon this flow-line is the Hoffman flow-line thermostat. This thermostat is a separate and distinct unit, and is in no way connected directly with the tank, nor does it come in contact with the water. In operation it utilizes the expansion and contraction of the flow-pipe as a motive force to operate the valve, and it can be quickly and readily removed from the system at any time without the necessity of draining the plumbing system or boiler. The system may be operated as a tank heater unit, lighting and outing the burner manually in case a necessity should arise that would require the removal of the thermo valve.

The flow-line control, it is claimed, gives an even temperature of water, minimizing the destructive effects of uneven expansion due to a wide and varied range of temperature in the tank. With the flow-line control, the temperature of the tank varies only about 5 degrees F. from the top of the tank to the bottom, prolonging the life of the tank. It also gives at all times the maximum capacity of the tank for demand.

The flow-line control is also said to protect the heater. It relieves the heater of the destructive effects of lime formation and over-heating, due to possible retarded circulation. The flow-line control, it is explained, in operation acts just the reverse of all ordinary thermostats; i. e., when the temperature of the water in the brass circulation line, extending from the heater to the top of the tank, reaches the temperature for which the valve has been adjusted, the expansion of the brass pipe is sufficient to open the valve, allowing the pressure of the gas to be exerted on the top of the diaphragm valve. This in turn immediately closes off the gas supply to the burner. Three degrees drop in the flow-line temperature immediately reverses this action and puts the heater in operation.

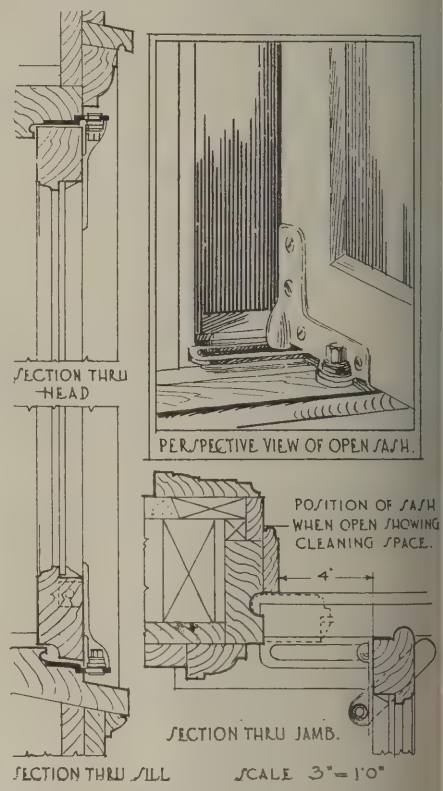
The pilot light also operates by this same control, and is automatic in operation. When the thermo valve on the flow-line is open, due to the expansion of the thermo element, the heater of course is not in operation, and the supply of gas that is holding the diaphragm valve in closed position also supplies the pilot light. When the thermo valve closes, due to the contraction of the flow-line, this supply is automatically cut off, and the pilot light is extinguished shortly after the main burner is ignited.

The mechanical construction of this flow-line thermo control permits interchangeability of parts, even to the valve disc. Thus, should any part of the control become injured or need replacement, it can be instantly and quickly accomplished.

The flow-line control thermostat has no stuffing boxes; the valves are free to open or close without friction of any kind, the action being in a vertical direction. The only stuffing box used in connection with this control is installed in the non-expanding adjusting rod, which furnishes the motion to the valve disc, but is not a part thereof. This stuffing box is patented, and can be tightened either by hand or with the aid of tools. However, the tension applied thereby will not in any way change the temperature adjustment.

"Lemco" Casement Window Hinge

ONE objection frequently made by housewives to the casement window is that it is almost impossible to clean the sash of the average side hung casement. The Lundell-Eckberg Manufacturing Co., Jamestown, N. Y., have developed a special hinge for casements which should do away entirely with that objection and so enable many a building to be equipped with casement windows which otherwise would not have them, thus losing much of their beauty and other advantages. This hinge is known as the "Lemco" casement window hinge. It is designed to permit the cleaning of the outside



Details of "Lemco" casement window hinge

of the sash from within by providing a five-inch space between the sash and the jamb when the sash is open at an angle of 90 degrees. It is equipped with an adjusting feature by means of which the resistance can be regulated to suit any size or weight of sash, holding it at any desired angle and doing away with the necessity of any other adjuster. It is adaptable to all types of outward opening casements in wood or metal.

A Course in Building Estimating

MENTION was made in these columns recently of "The Lumberman's Building Estimator." This book is now a part of a correspondence course in estimating for retail lumbermen, contractors, etc., conducted by the HoltBid Service Company, Lumber Exchange, Minneapolis.

The Only Journal Devoted Exclusively to the Contractor-Architect and Builder

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September 1923

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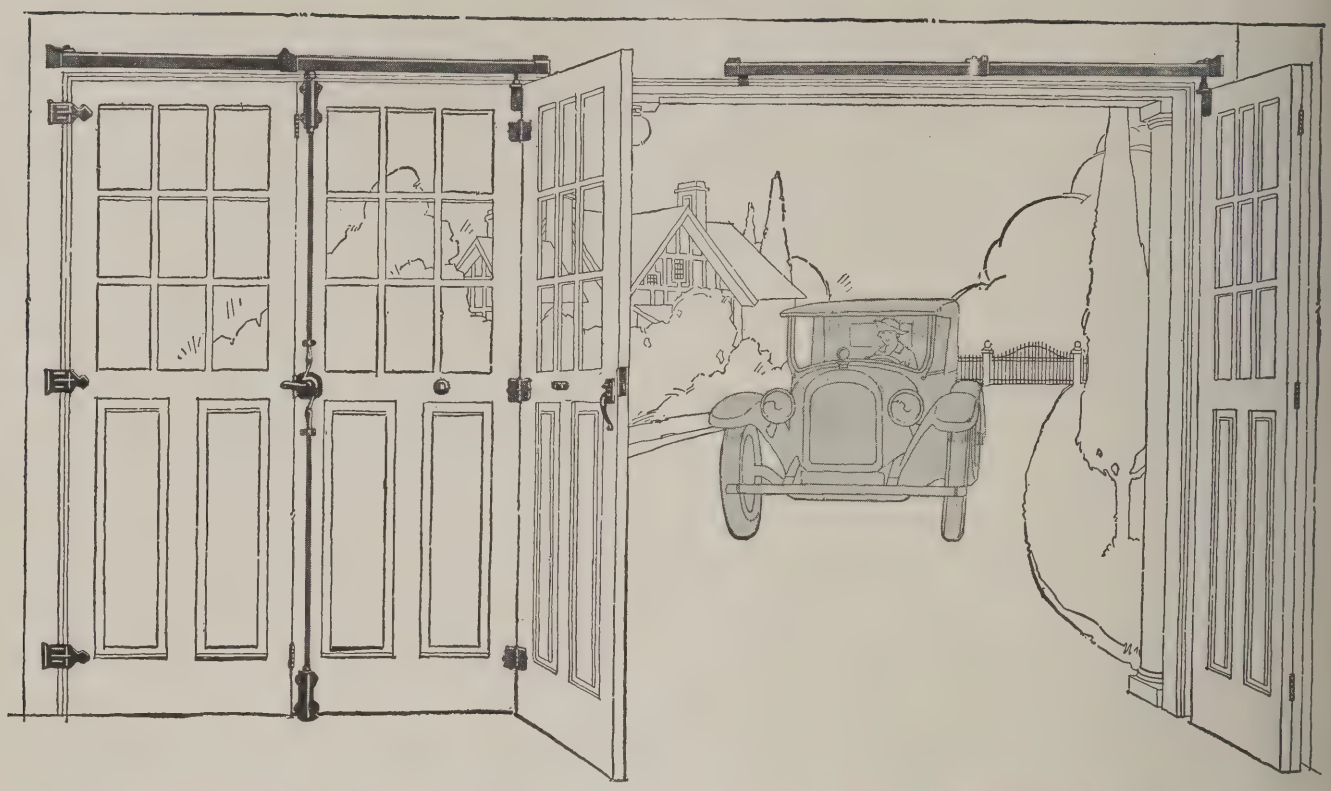

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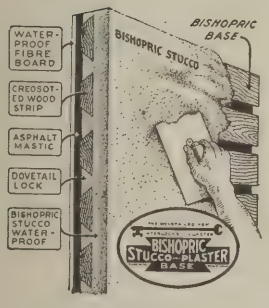

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National Builder

Hog Houses, Winter Work 'n Such

There will be an article about this "community" hog house in the October National Builder

BUILDERS of farm buildings will be interested in an article about an unusual hog house in the October NATIONAL BUILDER. Farmers will be asking for ideas and plans for housing their swine this winter and the builder who is on the job with some practical suggestions will get the business.

THAT is only one of a number of interesting articles to appear in the October issue. There is a hospital job recently completed in the East which contains some mighty good pointers for alert builders and these will be described in a well illustrated article.

OCTOBER marks the beginning, too, of the months when remodeling jobs are easier to get and are best done. There is a school-house down in Georgia recently remodeled which an article in the October issue will describe. It will be of interest to every contractor and builder even though school-house jobs are few and far between for some.

CONTRACTORS and others who have occasion to use that old standby, the steel square, will find some very helpful facts about the steel square and its uses in a series of articles which will begin with the October NATIONAL BUILDER. These articles will contain information that cannot be found in regular books on the steel square or in any magazine article. The contractor and builder, as well as the craftsman, will find this series worth reading and copies of the magazine containing the articles worth filing away for future reference.

THE foregoing are just a few of the articles that will appear in the October NATIONAL BUILDER, yet these alone would make that issue a veritable reference book for the contractor and builder. Don't miss it.

NATIONAL BUILDER is a journal for the contractor, architect and builder. It is published on the first of each month by the Tradepress Publishing Corporation, 542 South Dearborn Street, Chicago, Ill., to whom all communications concerning subscriptions, contributions or advertising should be addressed.

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Contributions to the editorial pages will be accepted solely on their merits and paid for at the regular space rates. Contributions of timely nature must be in on the 15th of the month preceding date of issue.

Advertising: Space in the advertising pages is sold according to published rates, furnished on application. Copy must be in on the 15th of the month preceding date of issue if proofs are to be submitted for approval before publication. Last forms close on the 23rd of the month preceding date of issue. The publishers reserve the right to reject or revise any advertisement containing statements of doubtful authenticity or derogatory to any building material, accessory or equipment.

Mechanical Requirements: Type size of page, 7x10 in.; half-page, 3½x10 in. or 7x4⅞ in.; quarter-page, 3½x4⅞ in. or 7x2⅜ in.; eighth-page, 3½x2⅜ in. Screen required, 120 line; reversed plates must be stippled or Ben Day.

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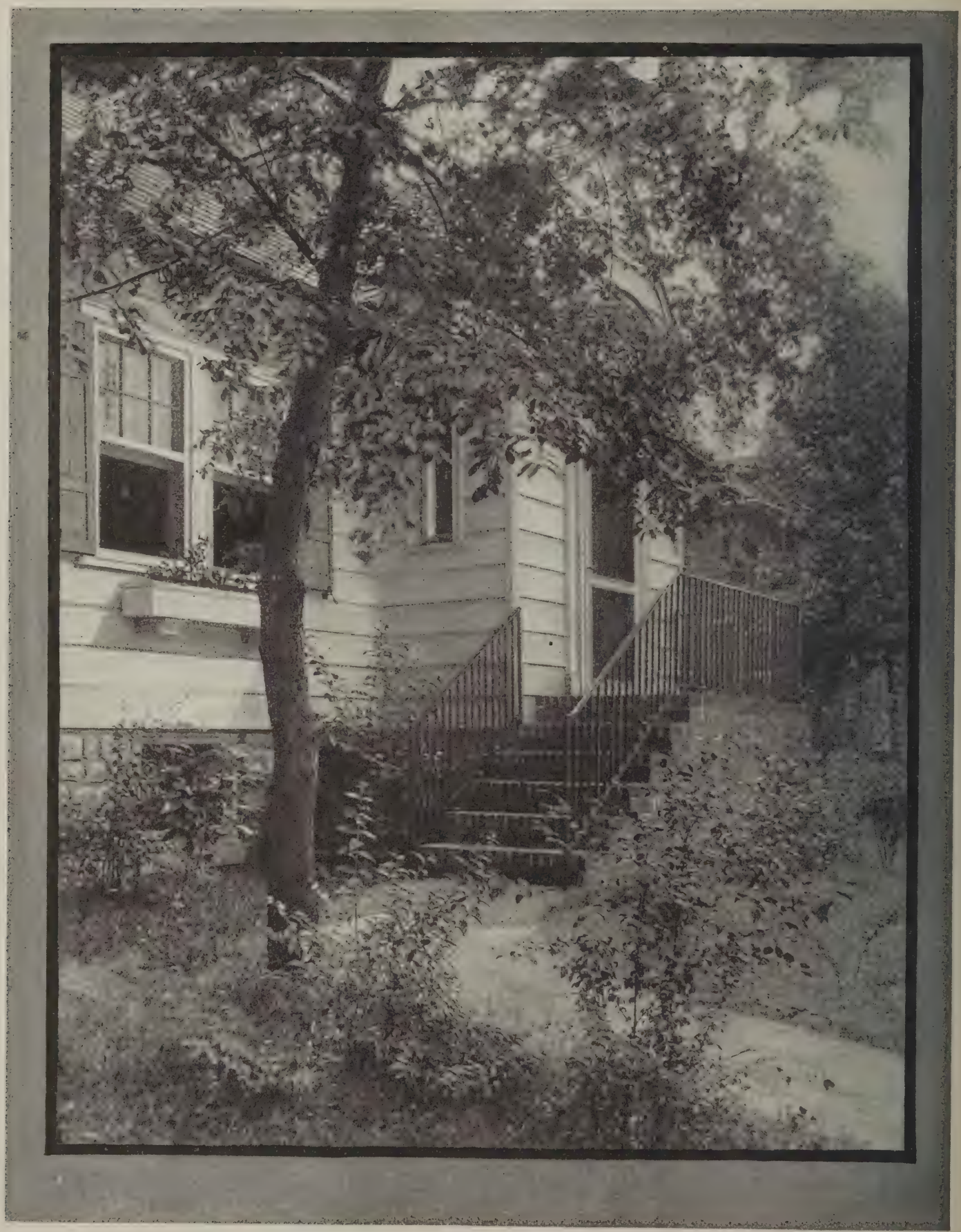
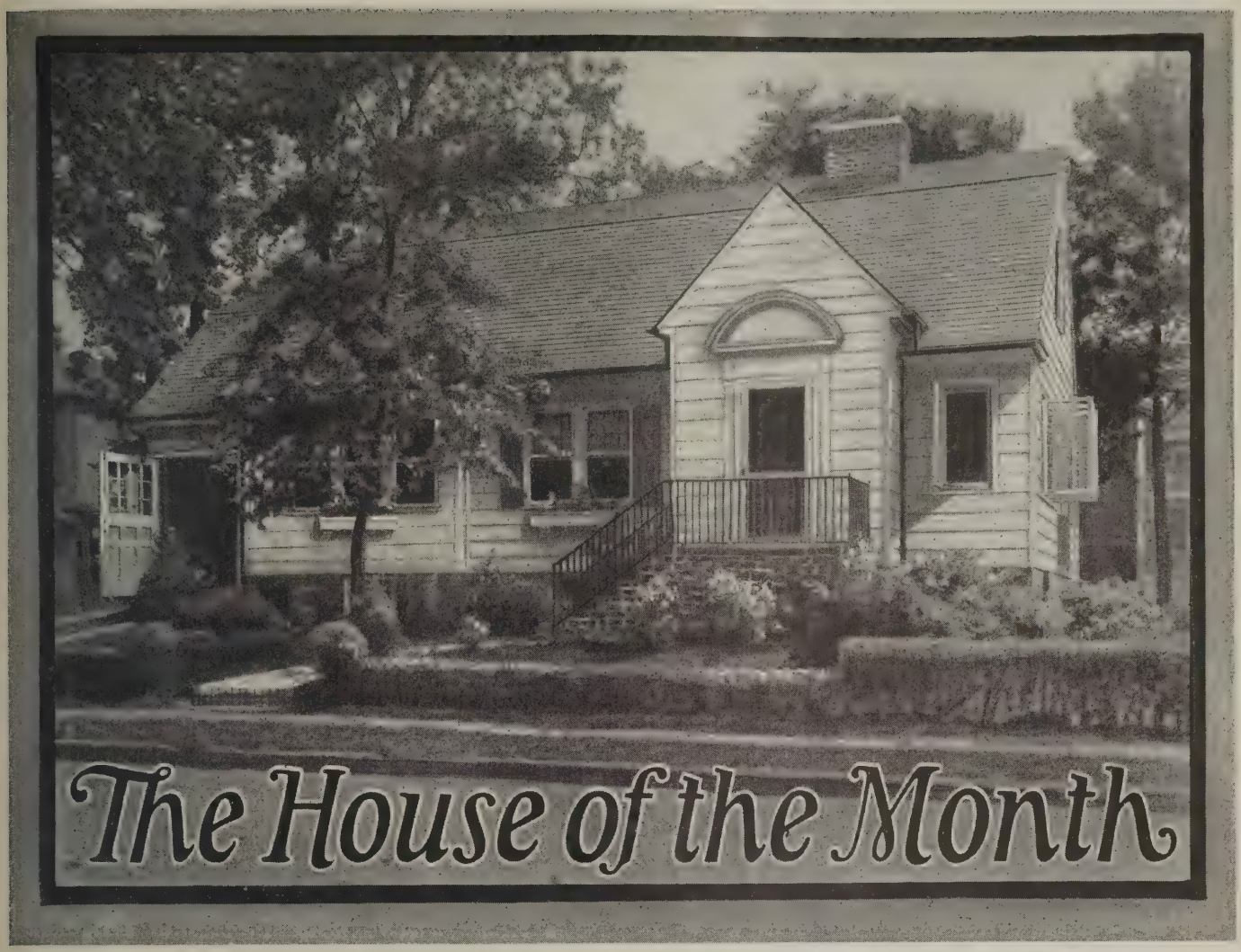


Even the house on a high foundation can have an attractive entrance, if it is properly designed. Wrought iron balustrades do their part here

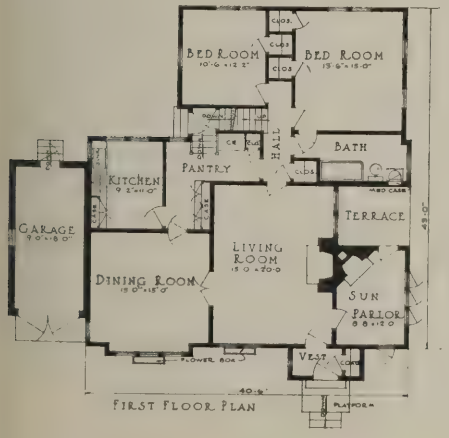


The House of the Month

THIS little house is in Mt. Vernon, New York, the home of Mr. William F. Hayes. It might be called a Colonial bungalow. Stern and Peyser were the architects and the house was built by De Raffelle Brothers. It was built in 1921 at a cost of $14,000.

Here is a house on a high foundation that looks right. It is because it was designed to do so. The picture on the opposite page shows delightful handling of the front entrance. Study the proportions of the gambrel roof and the treatment of the gable end in the picture below, for in these points lies much of the beauty of the house. The construction is wide lap siding, with wood shingle roof and stone foundation.

The floor plan shows an interesting interior arrangement: The sun parlor and living room each have a fireplace. An unusual detail is the terrace with brick floor and iron balustrade of the same kind that encloses the entrance steps and platform. It is entirely open on one side, as is seen in the photograph below. The stairways are conveniently arranged. A maid's room with a lavatory, and a large storage space are provided on the second floor, which is lighted and ventilated by windows and louvres in the gables. Beneath the large bedroom and bath there is a billiard room in the basement. The garage is at one end of the house and incorporated under the main roof.



Floor plans and views of the house of Mr. William F. Hayes, Mt. Vernon, New York. Stern and Peyser, architects; De Raffelle Brothers, builders.

McKinley High School, Canton, Ohio

A Large Building in Which Metal Lumber and Concrete Construction Were Employed Throughout, Including the Use of the Pressed Steel Type of Fireproofing

By A. H. Bromley, Jr., M. A. S. C. E.

A DESCRIPTION of this building is of general interest because it is said to be the largest and most up to date school in the state of Ohio, and one of the ten largest high schools in the country; it is of special interest to the builder because of the use in its construction of the latest and most efficient and economical methods of construction, including the use of the pressed steel type of fireproofing.

The McKinley high school building is a large one, because it is designed to serve as the senior high school of the entire city for years to come.

The school is situated near the center of the city and is built on a plot of ground extending from Market Avenue North to Walnut Avenue North East, 500 feet long by 246 feet wide.

The building consists of three main floors, a full basement, and a sub-basement under the rear portion of the building and all of the corridors.

There are in all about 200 rooms, including 80 class rooms and 6 study halls.

In general plan the building is a hollow square with a court in the center which is about 150 feet long and 90 feet wide.

This court insures well lighted class rooms on the four inner sides of the building. And the corridors are brilliantly lighted by direct daylight, which comes from the open spaces between the side class rooms. The corridor on each floor is about 760 feet long. This fact will give some idea of the size of the building.

Owing to the possibility of buildings being built to the property line on either side, the side class rooms of the main floors are built as separate projections, so that they are lighted from the intervening spaces between the class rooms. The basement floor area also includes these spaces between the upper outside class rooms, with skylights over them which insures good light and ventilation.

In accordance with the state code, each class room provides for 30 pupils. There are three study halls for 70 and three for 120 each. The entire school therefore provides for 2400 pupils in class rooms and 570 in study halls or a total of 2970 pupils. The school normally provides for about 2500 pupils on full time basis, not including those in the industrial departments.

The floor area of the building is over 271,000 square feet, exclusive of the porticos, stairways and inclines.

The cost of the lot was $85,331.65, and the building, including construction, furniture and equipment cost $2,350,000.

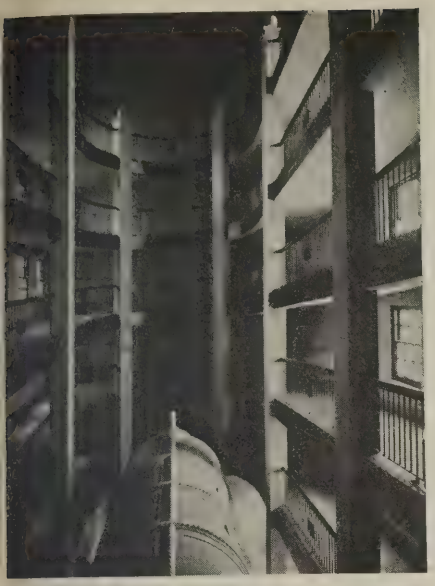
The building was constructed under two contracts, the first portion being started in 1915. As the building was badly needed and the money available, the second portion was contracted for and built during the period of high costs incidental to the war, and completed in the fall of 1921. It is estimated that had the building been completed under pre-war conditions the total cost of the building would have been about $1,500,000.

The McKinley High School is in general plan a typical up-to-date senior high school, and as a unit is most complete, providing as it does rooms for the usual teaching purposes, and for an extensive industrial program of both day and evening classes. It also includes four gymnasiums, a swimming pool, library and a complete cafeteria. In addition to these there are two auditoriums which are also used independent of the school work.

The east projection of the building facing on Walnut Avenue contains the main auditorium, with the front of the main floor on the level of the first floor of the school, and with entrances from the first floor corridor, and also entrances from the second floor corridors of the school to the front ends of the balcony.

Under this main auditorium is located a large assembly hall or secondary auditor-

Principal facade, McKinley high school building, Canton, Ohio. It is of concrete construction, with metal lumber. The walls are of Kittanning brick with stone window caps and sills



Spiral ramps six feet wide and with a grade of one foot in twelve feet lead to the main auditorium

The interior court offers opportunities for social gatherings. Note the promenade balcony one story above the court and the electric lights to brighten them at night

ium, with its main floor on the Walnut Avenue entrance level, which is considerably below the level of Market Avenue, consisting of a small stage, a large level floor used as an exhibition gymnasium and raised seats from which the stage and the level floor can be seen.

The main auditorium has a seating capacity of 1100 on the main floor and 655 in the balcony, or a total of 1755.

There are independent entrances to the main auditorium from Walnut Avenue through a large foyer in which there is a ticket booth, and by two spiral inclines, one on either side of the foyer. These inclines or ramps are novel features, each being six feet wide and having a grade of one foot in twelve feet. The illustration shows their arrangement, and also shows the tops of the cloak rooms, which are located on the foyer level and inside of the ramp spirals. The inclines are constructed of structural steel with reinforced concrete slab runways, and extend to the top level of the balcony. These separate means of exit, in addition to two stairways, comply with the state laws.

The stage has an arched front, 38 feet wide and 17 feet high. The depth of the stage is 39 feet, 25 feet back of the arch and 14 feet from the arch line to the footlights.

The lower or secondary auditorium is well adapted for large music classes, orchestra, band or chorus practice; also for inter-class or inter-school games, as the floor is large enough for gymnastic exhibitions and indoor games of various kinds, and also for dancing.

This lower auditorium is about 108 feet long and 98 feet wide, with a clear floor space 108 feet long by 47 feet wide.

Besides the gymnasium in the lower auditorium, previously described, there are four other separate gymnasiums, two indoor and two outdoor, one on either side of the foyer on the basement level, each about 80 feet long and 39 feet wide. Over the tops of these two gymnasiums there are two outdoor gymnasiums of similar size, which offer excellent opportunities for open air exercise. The interior gymnasiums and the lower auditorium are on the Walnut Avenue entrance level, and have separate entrances from that street.

Large locker rooms are provided adjacent to the gymnasiums, and there are separate corridors leading from the locker rooms to the swimming pool. The pool is located under the east end of the court, lighted by vault lights, and is used by the girls in the mornings and the boys in the

Fig. 1—The entire absence of temporary wood form work in the construction of the floors and roofs permitted rapid construction

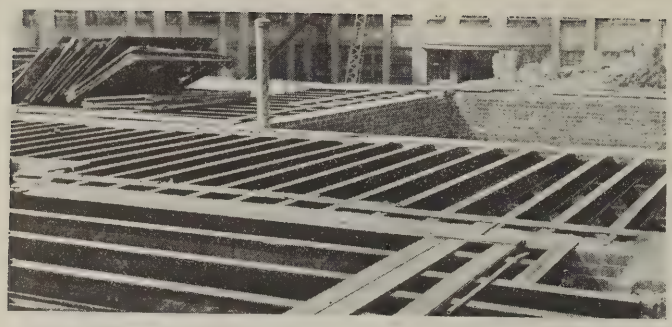


Fig. 2—Metal lumber joists in place. Note the framing for a vent in the right foreground

Fig. 3—Concreting the roof. The 2-inch concrete fill is ready to be spread. Note the absence of sleepers

afternoons.

The cafeteria is large and very complete. It consists of eight rooms—the main cafeteria, two service cafeterias, kitchen, vegetable kitchen, bake shop and two dish-washing rooms. The equipment, exclusive

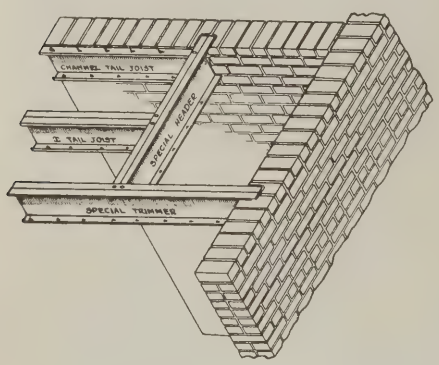


Fig. 4—Detail of framing for vents

of the dishes, consists of 32 items and 803 separate articles. It will accommodate 608 pupils at one time.

One of the interesting features of the building is the interior court, with its numerous walks and turns, a fountain in the center, and the promenade balcony one story above and surrounding the court. This court being just outside of the main cafeteria windows, and on the same level, offers excellent opportunities for social gatherings.

The fire towers in the inner four corners of the building are also novel features in design. These corners would ordinarily be considered dark and undesirable, but the open double tier of stairways in each tower provides for the lighting of the stairways and platforms from three skylights overhead. The dividing of the stairways in the center really provides eight separate flights of stairs in the four towers.

The principal problem presented to the architect, George F. Hammond, of Cleveland, Ohio, was the designing of a building of very considerable size on a lot somewhat restricted at the sides. It was therefore necessary, in order to assure permanent legal lighting under the laws of Ohio, to design the building so that it would not depend on any light whatever from the adjoining properties should they build up close to the lot line en bloc.

Owing to the extensive depth of the building from street to street, no special attempt was made at architectural decoration, save only the stone portico on Market Avenue. The building itself is constructed of Kittanning brick with stone used for window caps and sills.

The general effect of the building is most pleasing as the effect of the units which project from the main building gives it a character by reason of the light and shade of the recesses formed thereby.

This building is said to be one of the best examples of design from the office of Mr. Hammond, the architect. The satisfaction expressed after the first term of its use by the Canton school authorities, and the opinions as given by eminent educators who have examined it, is good testimony that the school ranks high among this type of schools in the country.

Mr. Hammond has been for some years engaged in making a special study of very low price school construction, and states that he has recently developed a very novel idea in planning which will probably be worked out in buildings in the near future.

From the builders' standpoint, a feature of interest was the use of the metal lumber fireproof system of floor and roof con-

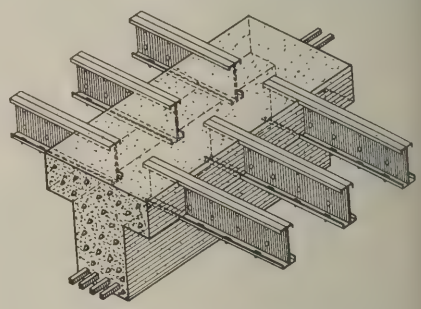


Fig. 5—Detail showing metal joists and concrete beams

struction. The use of ¾-inch "Ribplex" for the stepped balcony floor was also an interesting detail of construction.

As may be seen by Fig. 1, the entire absence of temporary wood form work in connection with the floors and roof, permitted rapid construction, owing to the elimination of the great amount of labor and the cluttered up condition, caused by unnecessary supports, etc., required in the installation of the heavier and more bulky types of fireproof construction.

This illustration gives some idea of the extent of the building. It shows nearly all of the portion covered by the first contract, namely, the front portion and right wing; also that section of the rear building which faces on the inner court.

Metal lumber joists can be seen in place

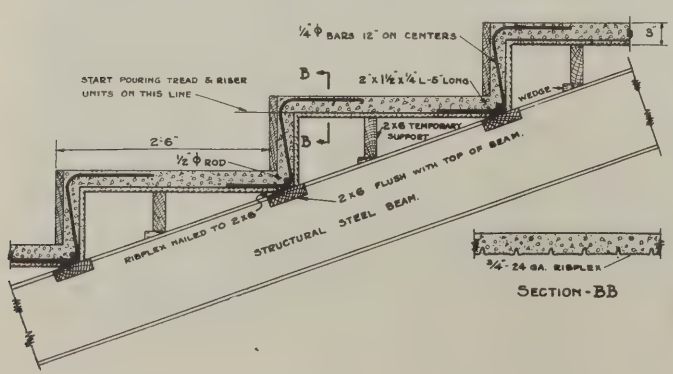


Fig. 6—Section showing balcony construction

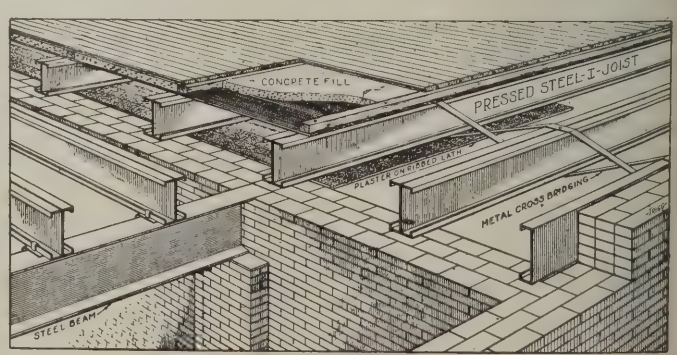


Fig. 7—Typical metal lumber construction

in the foreground, on a lower floor, and also in the front and side corridors. These were bridged and covered with boards so that work could be immediately started on the walls for other stories above that level.

The small amount of storage space required, and readiness with which they can be handled, are clearly shown by the two piles of joists on the upper and lower floor levels.

Fig. 2 is a close-up view of metal lumber joists in place, and in the right foreground the framing for a vent is shown. This is framed in the manner shown in Fig. 4, the trimmer and header joists were made slightly oversize, and the tail joists of standard size. These trimmer and header joists were made with flat flanges, so that connections could be made without other work on the job than riveting or bolting the connections.

The concreting of the roof of one of the wings of the building is shown in Fig. 3. In the foreground the 2-inch concrete fill is spread and ready to be smoothed, which work is being done by the workmen. The sleepers were omitted, as is usual where wood floor finish is not used.

In the center of the picture the ⅜-inch Ribplex is shown as installed on top of the joists ready to receive the concrete, and the finished slab is shown to the left, covered, to keep the concrete from freezing, as both joists and concrete were installed in cold weather.

Owing to war conditions, there were difficulties in obtaining materials and the beams in the first floor of the building built under the second contract were of reinforced concrete. The typical manner of installing steel lumber in connection with these concrete beams is shown in Fig 5. The steel joists extend through the side flange and two inches into the stem of the concrete beams.

The simplicity of design, ease of erection and elimination of expensive form work, together with minimum labor costs, all important factors in economical building construction, are clearly evident in the description of this building.

Where wood floors are installed, 1¾ x 1¾-inch wooden sleepers as shown in the typical drawing Fig. 7, were nailed to the tops of the steel joists, and the wood flooring boards in turn nailed to them. The nature of the ceiling construction is also shown in this drawing.

Fig. 6 is a cross section through the balcony floor construction.

The formation of the steps is based upon the use of ¾-inch, 24-gauge Ribplex, as shown in the drawing.

This was furnished cut to length and bent to the right angle shapes as shown.

The Ribplex supplies the form work for the back of the riser, and also the centering and reinforcing for the flat slab.

The inclined 12-inch structural steel beams are spaced at about 5 foot 6 inch centers, therefore the risers which act as cross beams are reinforced with ½-inch round rods; bent ¼-inch rods are also installed to reinforce the slabs at their points of connection to the concrete beams or risers.

Small structural angle seats are attached to the top flanges of the 12-inch beams to prevent the possibility of any sliding motion of the risers.

The temporary shoring, which is also indicated in the drawing, is extremely simple, requiring only three longitudinal pieces of wood to each step.

The absence of heavy contractor's equipment is noticeable in the illustrations, and is because of the nature of the materials used. This fact is worthy of note when the extent and very substantial nature of the building is considered, involving such large quantities of materials as approximately 56 miles of steel joists, seven miles of steel studs for vents, 8300 square feet of ¾-inch Ribplex for the balcony floor, 74,000 square yards of expanded metal lath and ⅜-inch Ribplex, in addition to the vast quantities of masonry. Only two electric derricks and one electric concrete mixer were included in the equipment.

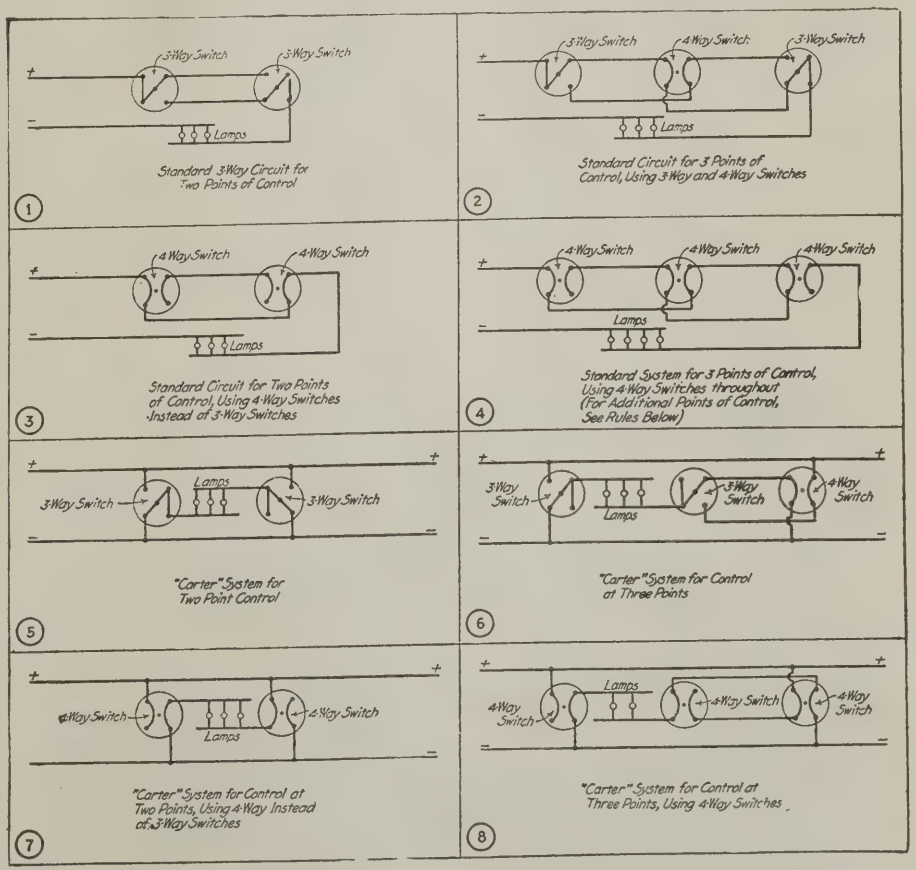
The McKinley high school is named in honor of the martyr President and his sister, Anna McKinley, who was a teacher in Canton schools for twenty-seven years.

Wiring Diagrams for Controlling Lamps from One or More Points

THE accompanying diagrams illustrate circuits which may be used for switching on and off groups of lamps from one or more points. The lamps may be controlled from any switch without regard to the position in which the other switches have been left.

In circuits Nos. 2 and 4, only three points of control are shown, but it is evident that the scheme indicated can be extended to include any number of points of control by adding additional four-way switches connected in the same way at the middle switch. Remember that the "travelers"—the two wires which run parallel between the switches—must be connected to the four-way switches in such a way that they lead to points diagonally across the switch from each other.

If the proposed change is made in the third paragraph of Rule 24c of the N. E. Code, Diagram No. 5 will illustrate the wrong way to wire a two-point control circuit. The proposed paragraph reads: "Three-way switches are considered as single-pole switches and shall be so wired that only one (1) pole of the circuit will be carried to either switch."—Laboratories' Data.



Diagrams of circuits which may be used for switching on and off groups of electric lamps from one or more points without regard to the position in which the other switches have been left. In circuits Nos. 2 and 4, only three points of control are shown, but the scheme indicated can be extended to cover any number of points of control by adding additional four-way switches connected in the same way as the middle switch

Community School Plans

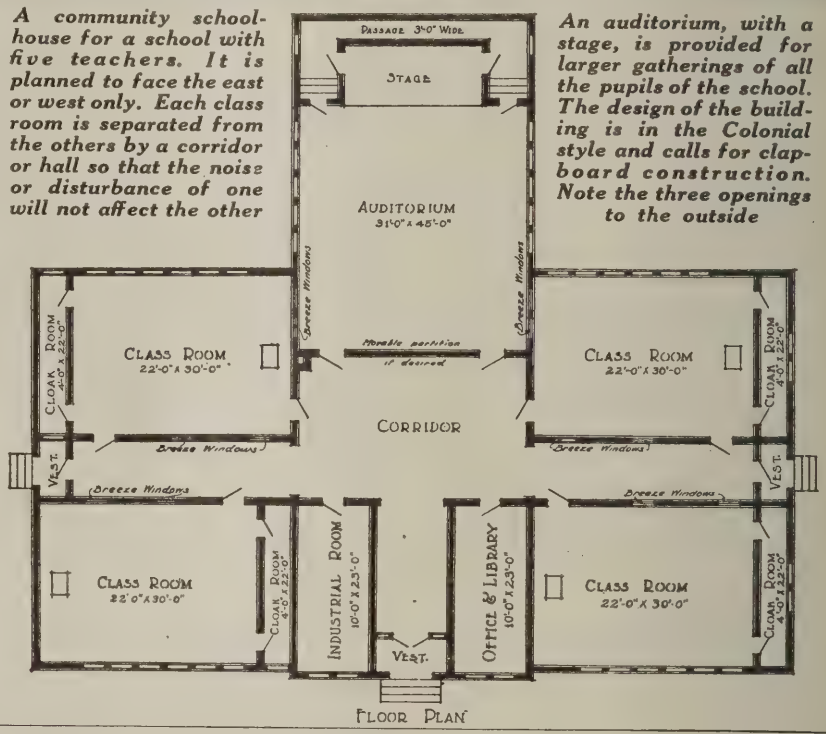
By the Julius Rosenwald Fund, Nashville, Tennessee

IN the hope that NATIONAL BUILDER might be of help to its readers by putting before them plans and designs for a few schoolhouses of small size and that are properly planned and designed for the use of rural and small town communities, permission has been obtained from The Julius Rosenwald Fund, Nashville, Tennessee, to publish here a few sketches taken from their pamphlets on "Community School Plans." These plans have been worked out for the Fund by Mr. S. L. Smith, General Field Agent for Rural Schools, with the co-operation of Dr. Fletcher B. Dressler, of George Peabody College. Complete plans for these buildings are furnished without cost through the State Departments of Education in various Southern states.

Dr. Dressler, in pointing out the important features of these plans, says:

"All class rooms demand, in our latitude, an east or west exposure to the light. A class room with light windows facing the east will afford opportunity to give the whole room a sunning every clear morning before school opens, and while shades must be used for an hour or so

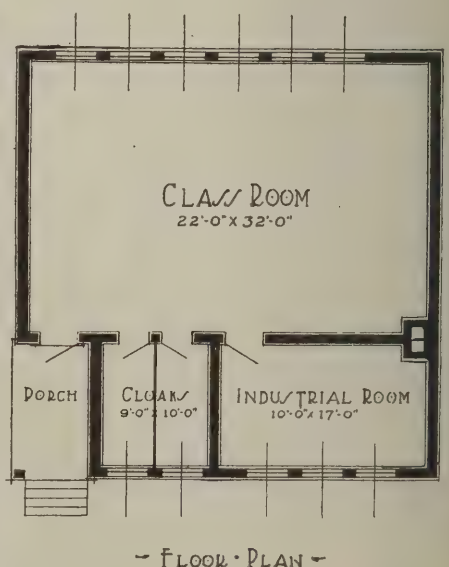
A community schoolhouse for a school with five teachers. It is planned to face the east or west only. Each class room is separated from the others by a corridor or hall so that the noise or disturbance of one will not affect the other



FLOOR PLAN

An auditorium, with a stage, is provided for larger gatherings of all the pupils of the school. The design of the building is in the Colonial style and calls for clapboard construction. Note the three openings to the outside

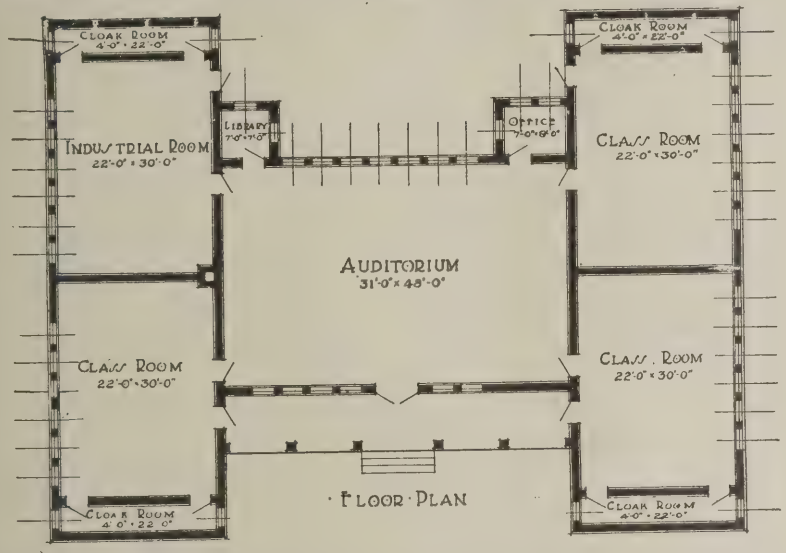
This one-teacher schoolhouse should face east or west only. The design is of the simplest type, with overhanging open cornice



FLOOR PLAN

There is an industrial room in addition to the class room and cloak rooms

This four-teacher schoolhouse should face the north or south only so as to provide east and west light for the class rooms. Note the long front porch



Each class room is thoroughly shut off from all the others and has its own cloak room lighted and cross ventilated by windows in the ends. The two front rooms have direct access to the porch, the rear rooms open directly upon the outside court in the rear. Note the isolated locations of the library and office. The auditorium, for general assemblies of the pupils and for community gatherings is equally accessible from the class rooms

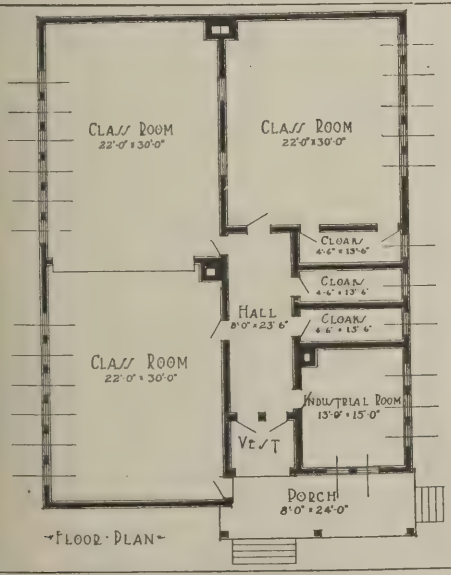
For From One to Five Teachers

after school begins to shield the children seated near the windows from the direct sunshine, after about ten o'clock the shades can be rolled up until the opening of school the next day, with the consequences that the room will have abundant light, the teacher be relieved from any further trouble with the shades and ventilation—either by lowering the upper sash, raising the lower, or by a combination of the two.

"Class rooms should have light windows only on one side. When windows are placed on two sides of a class room, one of three things is bound to occur: either the teacher will have to face the light, the pupils will have to face it, or the shades on one side must be drawn all day long.

"All class room light windows should be set at least four feet above the floor, be made to reach within six inches of the ceiling, the mullions between them made as narrow as construction will permit, and the amount of glazing be approximately one-fifth of the floor surface.

"The drawings or sketches herewith included represent suggestions made for the purpose of illustrating how this type of buildings and some others may be planned. I have used such in many parts of the country and they give good satisfaction, and lend themselves to a pleasing style of architecture."



This three-teacher schoolhouse has three separate class rooms, two of which can be thrown together

To get the proper light for each class room, this schoolhouse should face the north or south only. The design is a simple one, depending solely upon its good proportions for its attractiveness

Store Front Construction

IV.—Construction Details

By Roy M. Singer
Construction Editor, National Builder

IN store front construction there are three common methods of holding the heavy plate glass windows, viz.: wood frames, a combination of wood and steel, and copper strips. Any of the above-mentioned methods, which will be treated in this article, may be satisfactorily employed to hold the glass although, if incorrectly erected, the utility of any of these methods will be decidedly impaired.

Other things than cost enter into the choice of what material is to be used for the show-window frame. A wood frame such as illustrated in Fig. 1 is probably the cheapest in first cost but will, undoubtedly, require a larger expenditure for maintenance than either of the other two, as it will call for frequent painting and possibly, in a few years, some slight repairs. Steel-bound frames, of the type shown in Fig. 3, are higher in cost than the simple wood frame, but they are somewhat lighter in appearance and if properly painted will require little other attention for a considerable time. Copper strip construction is probably more expensive than either wood or steel, but it will require little, if any, maintenance cost, as it is not necessary to paint copper.

In the choice of materials for a store front frame the builder will probably try to do as he does in arriving at a selection for any other kind of material, and that is to secure the best possible result at the least cost.

In selecting his window frame material, the builder should carefully weigh all sides of the question. He should figure the first cost and the possible life of the type of construction he is about to choose as compared with the length of time the store front will be expected to remain unchanged. He should take into account maintenance costs and the value of appearance. Each one of the kinds of construction illustrated here is suitable for some type of job and it behooves the builder to take good care to select the right one. If a more expensive front is built than is required, money is wasted; and if a cheaper front is installed than is needed, the contractor will find himself with a dissatisfied customer.

In Fig. 1 is shown the head jamb and sill details for the construction of a wood frame show window. The head is fastened to the steel lintel with machine screws as shown and is rabbeted to receive a strip against which the glass bears on the outside. The exterior is finished with a strip of molding to provide a good appearance. On the inside a strip of felt lining is generally placed between the glass and the stop to act as a cushion, although it is often omitted. In the jamb detail note that the strip which holds the glass on the outside is built into the wall. This serves a double purpose. By setting this strip in the wall the contractor is assured of a strong base to hold his frame, as well as a sealed joint which will prevent the entrance of dust and moisture. At the sill a condensation gutter is provided back of the inside stop to receive any moisture which may condense on the glass. This gutter is generally lined with metal because of the tendency of continued wetting and drying to cause wood to rot.

Details for a steel-faced frame are shown

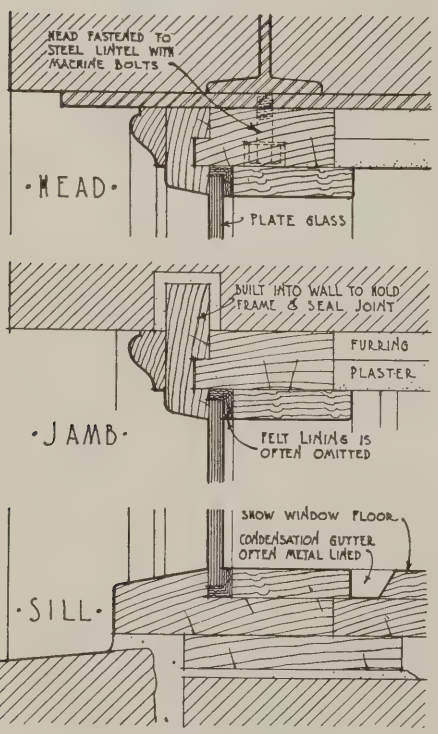


Fig. 1—Details of wood store front construction

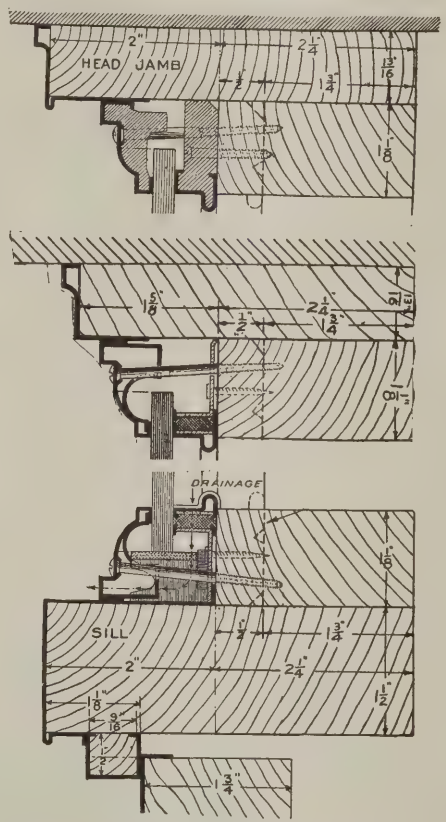


Fig. 2—Details of copper strip store front construction

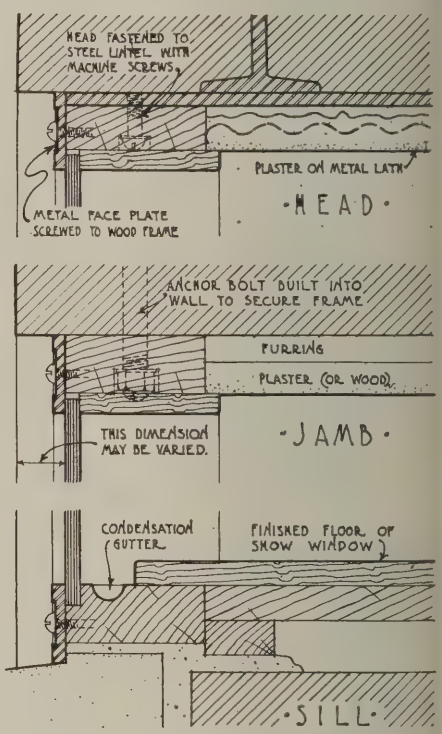


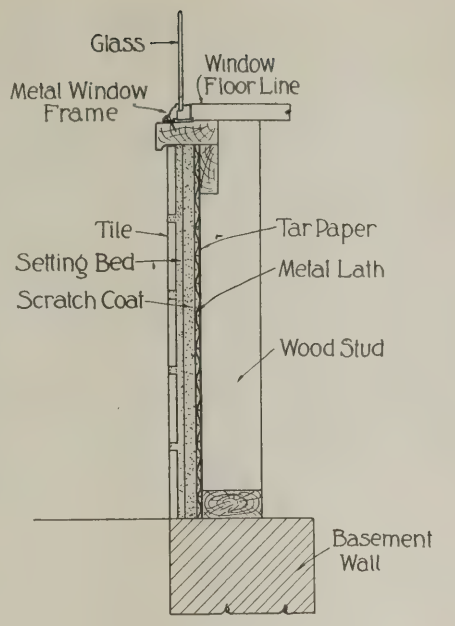
Fig. 3—Details of steel face store front construction

in Fig. 3. This type of frame has the head fastened to the steel lintel with machine screws, although bolts could be used instead. In this case the head is much simpler than for the wood frame. It consists only of the head-strip, the inside stop, and the metal face plate, which is screwed to the outside of the wood frame. The glass is held between the inside stop and the outside metal face plate. The jamb in this case is held to the wall by anchor bolts. Note that a heavy piece which is used for the sill is rabbeted to receive the glass and that the condensation gutter is a groove cut in the sill.

Copper strip construction is shown in Fig. 2. In this type of construction the glass is held by copper strips which are screwed to the frame. There are many kinds of copper strips on the market and each employs a somewhat different method for holding the glass in place. Notice that in the type of strip shown here, wood cores are used for backing up the copper molding strips.

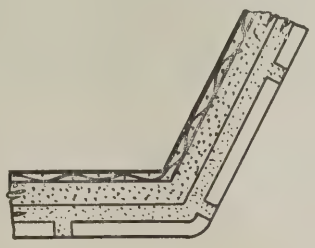
Some different types of copper strip construction are shown in Figs. 4, 5, 6 and 7, which illustrate the way the glass is held at other points than the head, jamb or sill when copper strips are used. Four different types are shown.

Fig. 4 shows what is called a three-way bar and it is used where it is desirable to hold three different panes. This bar has an inside steel strip which furnishes a base for holding the tension screw. In Fig. 5 a corner-bar for another type is illustrated. Note that in this type of construction the outside is a copper strip but a wood molding is used on the inside. The division bar, which is used to hold two panes of glass, shown in Fig. 6, is of that kind which employs a copper strip inside and outside and depends for strength and rigidity on a piece of tubular steel which also furnishes a base for holding the tension screw. Another type of construction of which a reverse corner bar is shown in Fig. 7, does not depend upon a tension screw for holding the glass, but has the tension applied indirectly by screwing up the set-screw at the side with a key. These different types vary considerably in cost but as one may be better suited to a certain requirement than another, the contractor should study his problem carefully and exercise his best judgment as to which is most suitable if copper strip constructoin is to be used.



TYPICAL SECTION THRU BULKHEAD

Fig. 8—Detail showing tile bulkhead installation



PLAN AT CORNER OF BULKHEAD

Fig. 9—Detail showing plan of tile bulkhead at corner

As tile is coming into quite general use as a decorative feature, it might be well to give here an idea of the essentials of tile construction. Fig. 8 shows a section through the bulkhead of a store front where tile is used on the outside. In the detail shown, a wood stud is used as a base upon which the bulkhead is built. A strip of tar paper or building paper is stretched across the studs and then metal lath is placed and fastened. A scratch coat is applied to the lath and allowed to set. Then the setting bed is applied, leveled, and the tiles set. A corner of a tile faced bulkhead is shown in Fig. 9. As a facing for store fronts, faience or glazed tile is generally used, although a vitreous tile may be used. It is difficult to make any general recommendations regarding exterior tile installations due to the different requirements of various localities.

American Homes Abroad

AN "Ideal Homes" exhibition in Melbourne has aroused great interest in American type houses and in mechanical housekeeping equipment. Trade Commissioner J. W. Sanger reports to the Department of Commerce.

The United States furnished most of the ideas for homes. House plans submitted were principally after the style of California bungalows, and the labor-saving devices entered in the contest were, in the main, American.

The domestic help problem in Australia is a serious one, and the movement toward smaller and more compact homes and furnished flats, and the use of labor-saving devices in the home is distinctly noticeable. A natural result of these new ideas in home making should be an increase in the Australian market for these products.

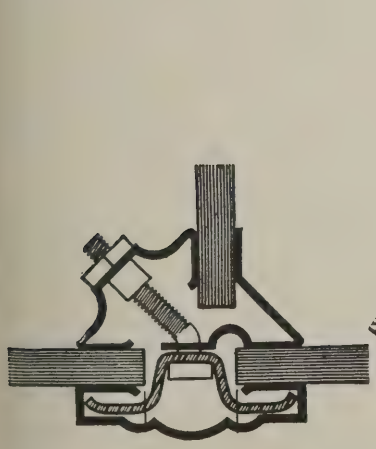


Fig. 4—Three-way bar showing copper strips inside and outside

Fig. 5—Corner bar showing copper strip outside and wood strip inside

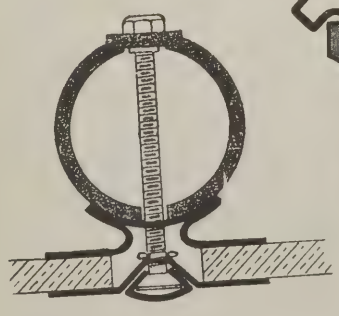


Fig. 6—Division bar showing copper strip outside and steel tube inside

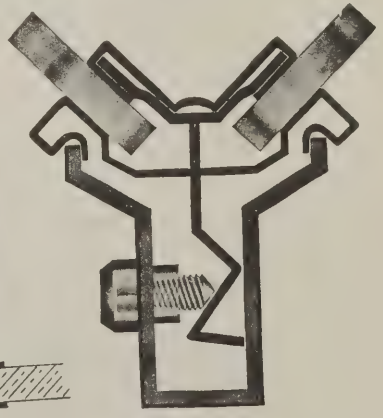


Fig. 7—Reverse corner bar for key-set copper strip construction

Bar details illustrating four different types of copper strip construction

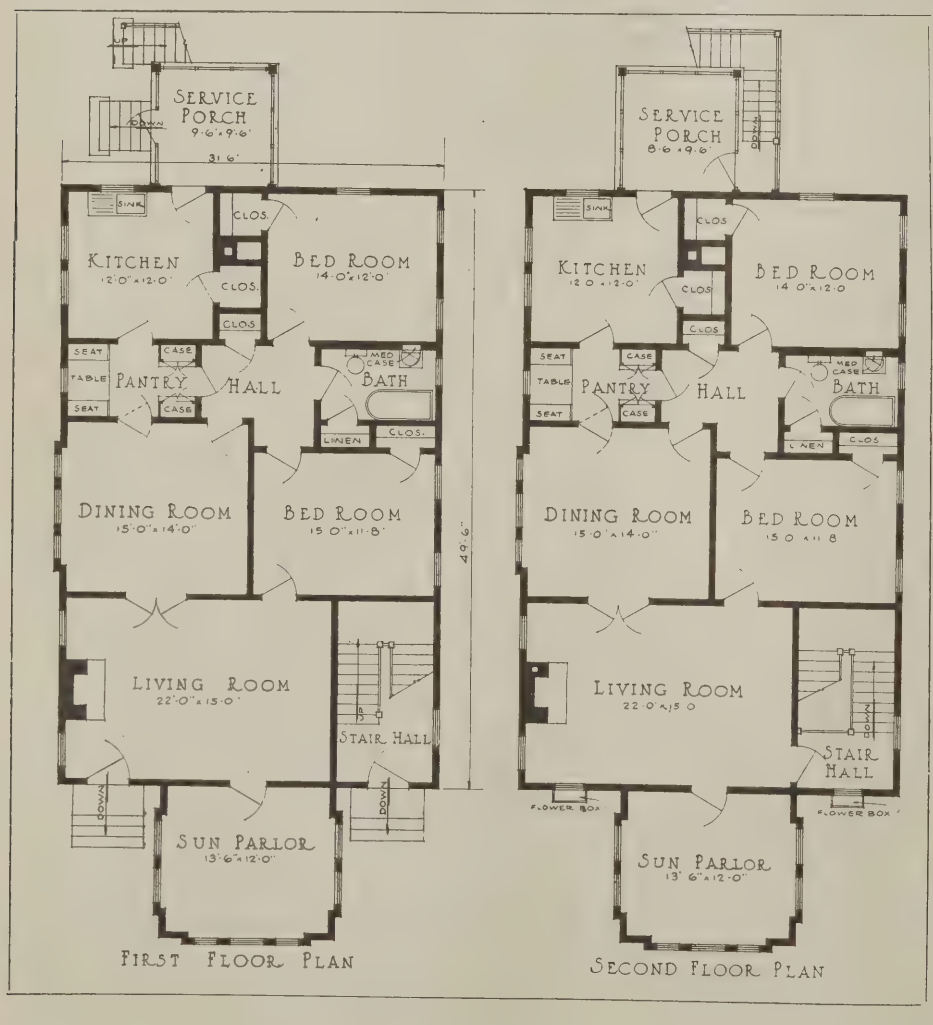
"Duplex" House With a "Homey" Appearance

HERE is a "duplex" house which is somewhat different from the usual type of two-family house and which illustrates in the floor layout some good ideas in planning. The first thought that comes to mind after glancing at the picture of the exterior is that this is a southern house, for it has that "down south" atmosphere.

Such is the case, for this house is located in Shreveport, Louisiana, and was designed by Seymour Van Os, an architect of that city. The exterior is of light gray stucco with white-painted wood trim. The roof is red tile, as are the inserts in the sun-parlor panels.

A study of the floor plan will show that here is a house built for comfort. Notice the size of the rooms and the provision for through ventilation from front to rear. Notice also that an individual entrance is provided for each apartment and that the stair hall is used only by the occupants of the second story.

Two-family house in Shreveport, Louisiana, designed by Seymour Van Os, architect



In the rear of the house the dining alcove and pantry cases are located between the kitchen and the dining room. This keeps the two rooms separate and prevents the heat and odors of the kitchen from reaching the room where food is being served. From the rear hall, access may be had to any room in the back part of the house, a fact which means that many steps will be saved by the housewife in the course of the day's work. The large amount of closet space shown will undoubtedly appeal to the woman of the house.

Each of the living rooms has a fireplace and these rooms are of unusually convenient arrangement. They have wall spaces which permit the placing to advantage of large pieces of furniture—the davenport, piano, or table. This is also true of all the bedrooms; they really have a place for the beds. These rooms are also correctly shut off from the kitchen. The sun parlors, with windows on three sides, are bound to catch most of the summer breezes, and in winter they will be bright and cheery. Windows on two sides of the stair hall will also keep it cool in summer and bright in winter.

Two-family houses of this kind are growing daily in popularity, for they serve a real economic need. They enable the family with small capital not only to own their own home but also to own someone else's. Thus their house is made a revenue producer and helps substantially to pay for itself.

A Group of Three Houses

Drawn Especially for NATIONAL BUILDER by the Regional Bureaus of The Architects Small House Service Bureau of The United States Inc. with Complete Quantity Surveys

U.S.A. ARCHITECTS' SMALL HOUSE SERVICE BUREAU INC.

TRADE MARK

AS this issue goes to press, a letter arrives with the following request: "I enclose check for sixteen dollars, three dollars as subscription renewal for *National Builder* for two years, and thirteen dollars as cost of plans for House No. 5A53 (March issue). I am about to build on a four-and-a-half acre tract. Any literature from manufacturers that might interest me will be appreciated."

The name of this subscriber will be furnished to responsible parties interested on request. His letter is quoted here as an example of the use that can be made by an intelligent builder of the complete plans for the houses, such as are shown on the following pages, that *National Builder* is publishing. One of these houses, built as an example of good small-house design and construction, will do much to influence other building and to start the ball rolling in a building campaign.

A great deal can be accomplished with this series of plans and a wide variety of houses built from them. Notice that two of the houses in this group are further developments of plans that have appeared in previous issues. Different architectural expressions are given the exteriors. This enables the builder who has a four-and-a-half acre tract to develop an opportunity for getting real variety in a large number of houses, even though many of them are of the same basic layout. Such an architectural service appeals to the large scale builder as well as the contractor constructing but one or two houses at a time.

Below is an explanation of the material and wiring symbols and miscellaneous data pertaining to plans on the following pages

MATERIALS		ELECTRIC WIRING SYMBOLS			
CONCRETE		CEILING OUTLET		3 WAY SWITCH	
BRICK		DROP CORD		GAS OUTLET	
WOOD		BRACKET		PUSH BUTTON	
PLASTER		BASE PLUG		BELL OUTLET	
TILE		SWITCH		BUZZER	

Dimensions are taken to outside of foundation walls, to outside of studs on exterior walls and center of studs for partitions.

Foundation walls shown concrete may be stone, brick, concrete block, or load-bearing hollow tile.

Where building ordinances permit, foundation walls may be 9 in. thick (with 20x9-in. footings), except in case of stone, which shall be 18 in. thick.

Stock numbers refer to moldings in Universal Millwork Design Book No. 20. In case these moldings cannot be procured, others of similar design and size may be substituted.

Provide 1⅛-in. screen and storm sash for all exterior openings, except ice door, unless otherwise noted. Bottom rail of storm sash to have vent.

©N. B. and A. S. H. S. B. of U. S.

Five Room Solid Brick House for a Thirty Foot Lot

House No. 5A61, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.

THIS is just the design for a five-room city house where the ordinance requires solid brick construction and the lots are narrow. A thirty-foot frontage is sufficient, in most cities, for this five-room house is 22 feet wide and 33 feet 4 inches deep exclusive of the rear porch. The porch is about 12 by 9 feet.

Although the roof is broken, this is practically a full two-story house with two good corner sleeping rooms, bath, linen closet and three clothes closets on the second floor.

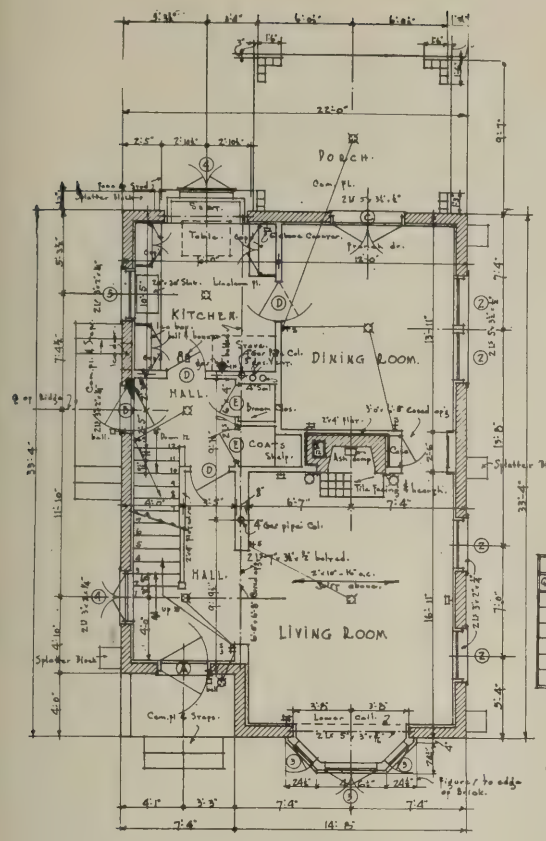
Construction is of solid brick walls. Interior support of floor beams is on a steel girder so as to equalize settlement and avoid the chance of cracked plaster.

Among the features to be considered in this design are the dining alcove that can be built in the kitchen, and the broom closet in the side entry where it is handy to the kitchen. The coat closet is placed where it is convenient to both entrances. The direct passage from the front door to the kitchen, the living room fireplace, and the bay window that adds so much to the beauty of the living room, are important features of the plan.

This five-room brick house has practically the same floor plan as House No. 5A53, published in the March issue, and House No. 5A54, in the April issue. Thus the builder has a choice of three different exteriors for this one popular type of floor plan. The shape of the roofs make a slight difference in the second floors, but not a change that affects the basic arrangement.

It is designed to face north or west, and should be reversed for other facings. Reversed plans are furnished without extra charge.

The regular price of this plan is $25.50. (To NATIONAL BUILDER subscribers $13.00.)

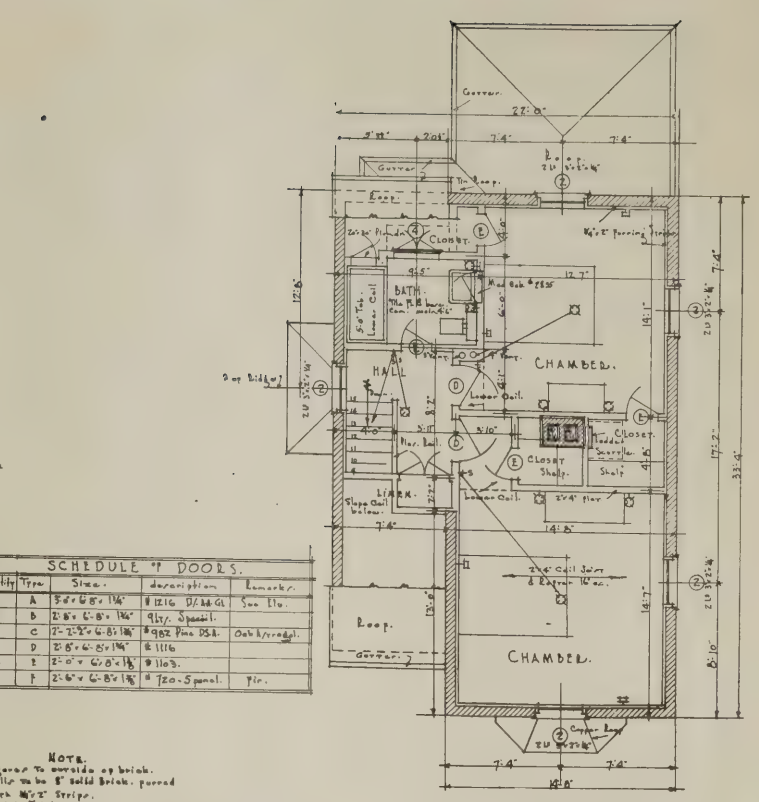


1ST FLOOR PLAN.
Scale ¼"=1'-0"

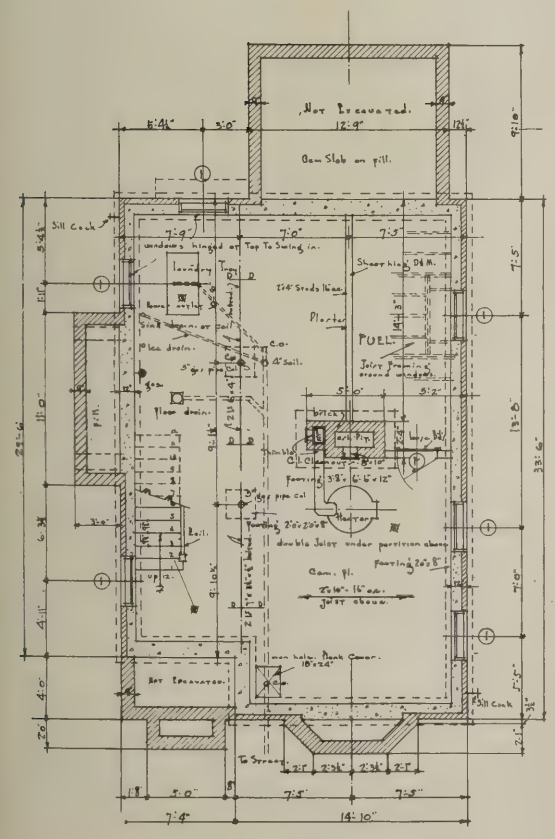
SCHEDULE of DOORS.				
Quantity	Type	Size	description	Remarks
1	A	3'-0" x 6'-8" x 1¾"	# 1216 D/Panel Gl.	See Elev.
1	B	2'-8" x 6'-8" x 1⅜"	9Lt. Special.	
1	C	2'-2½" x 6'-8" x 1⅜"	# 982 Pine DS.B.	Oak h/wrought.
3	D	2'-8" x 6'-8" x 1⅜"	# 1116	
6	E	2'-0" x 6'-8" x 1⅜"	# 1103.	
1	F	2'-6" x 6'-8" x 1⅜"	# 7Z0-5 panel.	Fir.

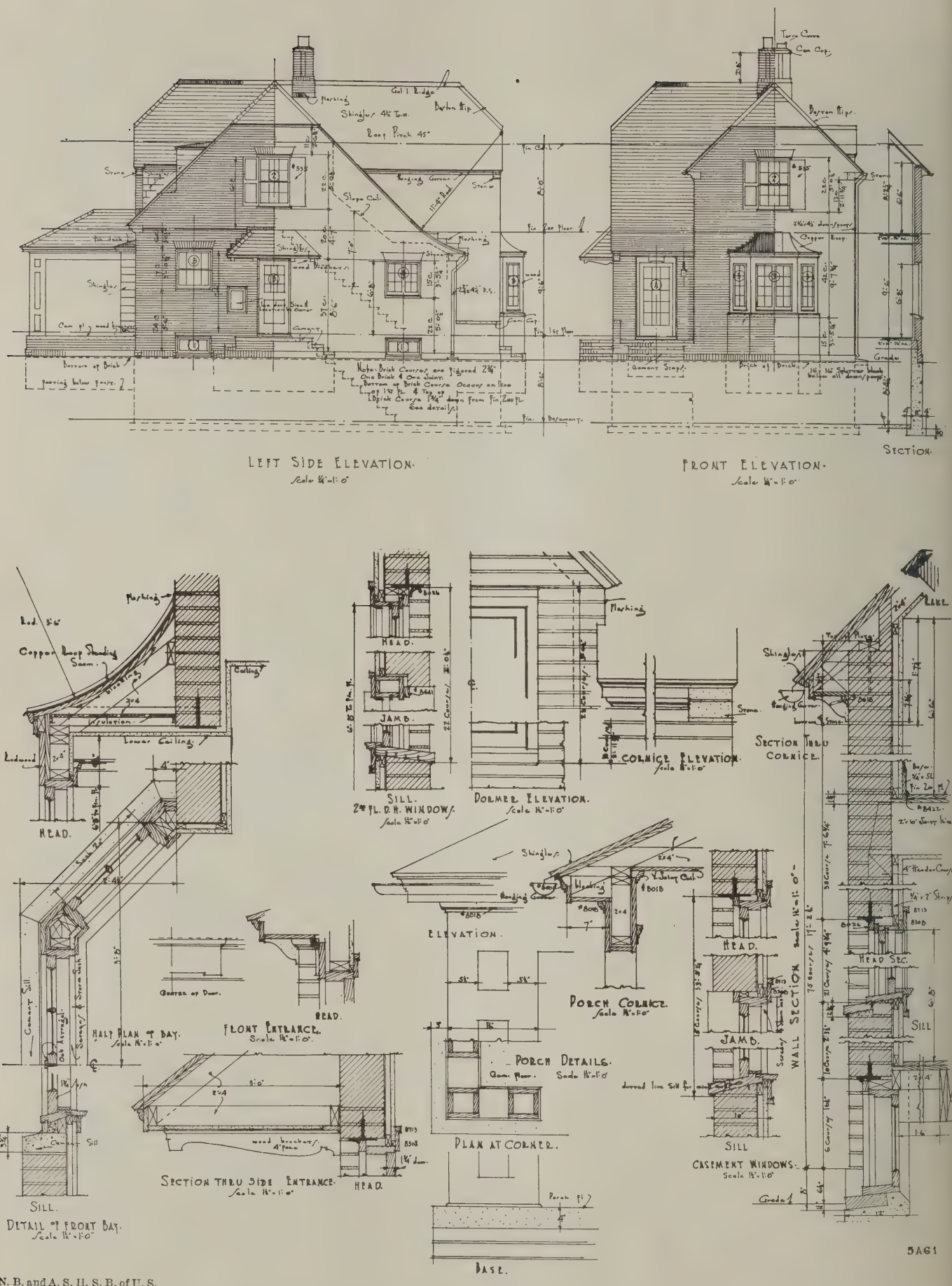
NOTE.
Figures to outside of brick.
Walls to be 8" solid Brick. pierced with 4½"x2" Strips.
Finish Thickness of walls 16"

SCHEDULE of WINDOWS.						
Quantity	Type	description	Lights	Glass Size	Opening Size	Thickness
6	1	Sing'e	3	14/24	2'-10" x 1'-5"	1⅝
9	2	D.H.	12	14/24	2'-10½ x 4'-6"	1⅝
3	3	Casement 1 pair	6	8/18	1'-8" x 4'-2	1⅝
3	4	Casement 1 pair	6	7/10	3'-0" x 3'-0"	1⅝
1	5	D.H.	16	8/18	3'-0" x 3'-6"	1⅝



SECOND FLOOR PLAN.
Scale ⅛"=1'-0"


Not Excavated.
Gen. Slab on fill.
FUEL
Sheer leg D&M.
Hot Air
Hot Air
Hot Air



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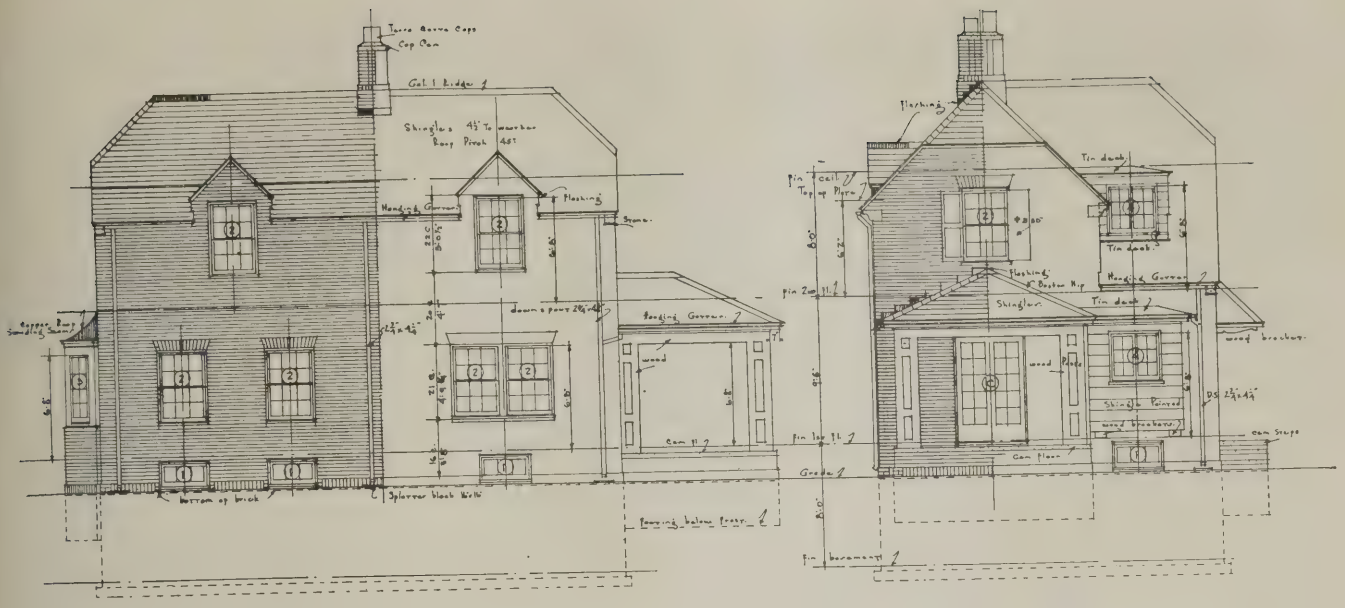
Left side and front elevations and construction details for House No. 5A61, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.



RIGHT SIDE ELEVATION
Scale ¼" = 1'-0"

REAR ELEVATION
Scale ¼" = 1'-0"

EXCAVATING—200 cu. yd.

BACK FILL—54 cu. yd.

FOUNDATION—If 12" wall, 47 cu. yd. gravel, 190 sax cement; if 9" wall, 38 cu. yd. gravel, 154 sax cement; if 12" tile, 22300 CBM tile, 16 cu. yd. mortar; if 9" tile, 18000 CBM tile, 13 cu. yd. mortar.

FACE BRICK—13328 face brick; 800 mortar color; 9 cu. yd. mortar.

COMMON BRICK OR TILE—16000 common brick or tile; 12 cu. yd. mortar.

CEMENT FLOORS—7 cu. yd. gravel; 3 cu. yd. sand; 64 sax cement; 6 cement spatter blocks.

CHIMNEY—2450 common brick; 450 face brick; 100 fire brick; 60 lin. ft. 8x12 flue tile; 18 sq. ft. hearth tile; 20 lb. fire clay; 3 cu. yd. mortar; 1 clean out door 8x10; 2—6" adjustable thimbles; 1 cast iron ash dump; 1 throat and damper; 1 angle 4x3x¼"—4'0; 5 yd. metal lath; 1 clean out door 8x12.

LATH—9 sq. yd. metal lath; 9500 wood lath.

PLASTER—9 sq. yd. plaster on metal lath; 680 sq. yd. plaster on wood lath; 16 sq. yd. Keene's cement.

TILE FLOORS—40 sq. ft. ceramic tile; 24 lin. ft. cove base.

LUMBER—54 lin. ft. 2x4 basement partition plates; 16—2x4-8 basement partition studs; 180 ft. D&M basement partition sheathing; 6 ft. plank clean out cover; 3—2x10-14 stair horses; 5—2x10-14 first floor joist; 23—2x10-22 first floor joist; 4—2x10-14 first floor joist doubles; 2—2x10-16 headers; 740 ft. com. bds. first floor subfloor; 980 ft. 13/16x1½ first floor finish floor; 300 lin. ft. 1x3 bridging; 110—1x2-9 wall stripping; 106—1x2-8 wall stripping; 1200 lin. ft. grounds; 3—2x10-16 stair horses; 252 lin. ft. 2x4 first floor partition plates; 76—2x4-9 first floor studs; 9—2x10-14 second floor joist; 23—2x10-22 second floor joist; 3—2x10-16 second floor joist headers; 700 ft. com. bds. second floor subfloor; 900 ft. 13/16x1½ second floor finish floor; 270 lin. ft. 2x4 second floor partition plates; 80—2x4-8 second floor partition studs; 10—2x4-14 second floor ceiling joist; 17—2x4-22 second floor ceiling joist; 400 ft. D&M attic floor; 2—2x10-12 porch girders; 4—2x10-10 porch girders; 10—2x4-10 porch ceiling joist; 20—2x4-14 studs and plates; 110 lin. ft. 2x8 wall plates; 160 ft. ceiling for porch; 2—2x6-12 ridge rafters; 18—2x4-12 rafters; 54—2x4-12 rafters; 6—2x4-20 rafters; 6—2x4-18 rafters; 6—2x4-8 rafters; 3—2x4-14 dormer studs and plates; 42 lin. ft. 1x6 ribbon rafters; 400 ft. shiplap; 1800 ft. boards roof sheathing; 13 M shingles; 10—2x4-16 look outs; 25—2x4-18 scaffold and extras; 8—2x6-16 scaffold and extras; 8—2x10-16 scaffold and extras; 6—2x8-14 scaffold and extras; 4—2x12-16 scaffold and extras; 2—2x4-18 valley rafters.

MILLWORK—Frames: 6 single 10x12-3L-1⅜; 7 single 10x12-12L-1⅜; 1 mul. 10x12-12L-1⅜; 2 single casement 8x11-8L-1¾; 1 mul. casement 8x11-8L-1¾; 3 mul. casement 7x10-6L-1¾; 1 wd. 8x18-16L-1⅜. **Windows:** 6 sash 10x12-3L-1⅜; 9 windows 10x12-12L-1⅜; 4 sash 8x11-8L-1¾; 6 sash 7x10-6L-1¾; 1 window 8x18-16L-1⅜. **Storm Sash:** 6—10x12-3L-1⅛; 9—10x12-12L-1⅛; 4—8x11-8L-1⅛; 6—7x10-6L-1⅛; 1—8x18-16L-1⅛. **Screens:** 6—10x12-3L-1⅛; 9—10x12-12L-1⅛; 4—8x11-8L-1⅛; 6—7x10-6L-1⅛; 1—8x18-16L-1⅛. **Shutters:** 3 pr. No. 585 for 10x12-12L wds. **Outside Door Frames:** 1—3'0x6'8-1¾; 1—2'8x6'8-1¾; 1—4'4x6'8-1¾; 1 icing door frame. **Outside Doors:** 1 3'0x6'8-1¾ (No. 1216); 1 2'8x6'8-1¾, 9 lt.; 2—2'2x6'8-1¾ (No. 982); 1 icing door; 1 oak astragal. **Storm Doors:** 1 3'0x6'8-1⅛; 1—2'8x6'8-1⅛; 2—2'2x6'8-1⅛. **Screen Doors:** 1—3'0x6'8-1⅛; 1—2'8x6'8-1⅛; 2—2'2x6'8-1⅛. **Outside Millwork:** 6 porch paneled posts; 52 lin. ft. porch facia; 52 lin. ft. porch soffit; 52 lin. ft. inside porch facia; 48 lin. ft. cove; 230 lin. ft. cornice; 4 entrance brackets. **Interior Doors:** 5—2'8x6'8-1¾ (No. 1116); 6—2'0x6'8-1⅜ (No. 1103); 1—2'6x6'8-1⅜ (No. 720). **Jambs:** 5—2'8x6'8; 6—2'0x6'8; 1—2'6x6'8; 1—6'0x6'8; 2—3'0x6'8. **Interior Trim:** 6 sides single 10x12-3L; 7 sides single 10x12-12L; 1 side mul. 10x12-12L; 2 sides single casement 8x11-8L; 1 side mul. casement 8x11-8L; 3 sides mul. casement 7x10-6L; 1 side wd. 8x18-16L; 1 side dr. 3'0x6'8; 1 side dr. 2'8x6'8; 1 side dr. 4'4x6'8; 1 side icing door; 10 sides dr. 2'8x6'8; 12 side dr. 2'0x6'8; 2 side door 2'6x6'8; 2 side door 6'0x6'8; 4 side door 3'0x6'8; 1 flight basement stairs and rail; 1 flight main stairs and rail; 1 ladder to attic; 1 scuttle door; 1 scuttle door jamb; 1 scuttle door trim; 1—20x30 utility door; 1 jamb utility door; 1 side trim utility door; 1 linen closet; 1 medicine cabinet (No. 2835); 1 mantel shelf; 1 book case; 2—3'0 cabinets with worktable; 1—3'6 cabinet; 1—5'0 seat; 1—3'0 table; 600 lin. ft. base; 600 lin. ft. base shoe; 600 lin. ft. base molding; 310 lin. ft. picture molding; 100 lin. ft. ceiling cove; 24 lin. ft. closet shelving; 20 lin. ft. closet hook strips; 12 lin. ft. closet clothes pole; 42 lin. ft. chair rail; 12 lin. ft. threshold.

TINWORK—88 lin. ft. gutter; 20 gutter hangers; 3 outside miters; 1 inside miter; 16 gutter ends; 5 nipples; 5 offsets; 5 elbows; 5 shut offs; 5 strainers; 76 lin. ft. conductor; 15 conductor hooks; 44 lin. ft. ridge roll; 4 finials; 30 sq. ft. tin deck; 40 sq. ft. copper deck; 46 lin. ft. valley tin; 300 tin shingles; 50 lin. ft. flashing tin; 16 lin. ft. chimney flashing.

INSULATION—640 sq. ft. ½" vegetable fibre or equal for roof; 1850 sq. ft. ½" vegetable fibre or equal for walls; 4 rolls felt for roof; 3 rolls felt for floors.

STEEL—2 angles 5x3x5/16—8'0; 2 gas pipe post 7'3; 2 angles 7x3½—9'6 with separators and bolts; 2 angles 6x4—20'0 with separators and bolts.

LINTELS—For 6 single frames 10x12-3L; 7 single frames 10x12-12L; 1 mullion frame 10x12-12L; 2 casement frames 8x11-8L; 1 mul. frame 8x11-8L; 2 mul. frames 7x10-6L; 1 wd. frame 8x18-16L; 1 door 3'0x6'8; 1 door 2'8x6'8; 1 door 4'4x6'8; 1 icing door.

HARDWARE—6 cellar sash sets; 10 sash locks; 10 sash lifts; 8 casement sash sets; 24 storm sash sets; 24 screen sets; 3 sets shutter hardware for pairs; 1 front door set with butts; 1 rear door set with butts; 1 double door set with butts; 1 icing door set with butts; 2 single storm door sets; 1 double storm door set; 2 single screen door sets; 1 double screen door set; 11 inside door sets with butts; 1 floor hinge; 2 push plates; 16 door bumpers; 4 doz. clothes hooks; 4 stair rail brackets; 280 lb. sash weights; 2 hanks sash cord; 900 lb. nails; 20 joist anchors; 1 coal chute; 6 lb. brads; 1 pr. hinges for scuttle door; 1 pr. hinges for ladder; 4 friction stays for utility door; (medicine cabinet: 1 pr. hingles, 1 cupboard turn); 2 pr. hinges for seat; (linen cabinet: 2 pr. ornamental butts; 1 cupboard turn; 1 elbow catch; 8 drawer pulls); (kitchen cabinet: 2 sets castors, 2 drawer pulls, 4 pr. ornamental butts, 2 cupboard turns, 2 elbow catches); (kitchen cabinet: 4 pr. ornamental butts, 2 cupboard turns, 2 elbow catches, 2 drawer pulls).

REINFORCING STEEL—24—⅜ rods—9'0; 9—½ rods—12'0; 14—⅜ rods—4'0.

WEATHER STRIPPING—9 sash 10x12-3L; 9 windows 10x12-12L; 4 sh. 8x11-8L; 4 sh. 7x10-6L; 1 wd. 8x18-16L; 1 dr. 3'0x6'8; 1 dr. 2'8x6'8; 1 dr. 4'4x6'8.

CAULKING—16 single frames; 4 mullion frames; 2 single door frames; 1 double door frame; 1 coal chute; 1 icing door.

EXTERIOR PAINTING—5 gal. trim paint; 1 gal. oil; 40 gal. shingle stain; 1 gal. screen paint; 1 gal. sash color; ¼ gal. shutter paint; ½ gal. shellac; 10 lb. putty; 1 gal. japan; 1 gal. turpentine.

INTERIOR PAINTING—12 gal. white paint; 8 gal. enamel; 5 gal. filler stain; 3 gal. shellac; 10 gal. varnish; 3 gal. floor shellac; 5 gal. floor varnish; 2 gal. oil; 1 gal. japan; 1 gal. turpentine; 1 gal. alcohol; 4 doz. sheets sandpaper; 3½ lb. steel wool.

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Right side and rear elevations and quantity survey for House No. 5A61, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.

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A Sun Room and Arched Entrance for This House

House No. 6A58, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.

A BEAUTIFUL design for a six-room brick house is illustrated here. The five-sided sun room, the arched entrance and the tile inserts give decided individuality to the exterior.

This house has practically the same floor plan as House No. 6A46, published in February, and 6A50, shown in May, except the former is of stucco and the latter of siding. There is a slight difference in the second floor arrangement. As a result the builder has a choice of three materials for the same floor arrangement.

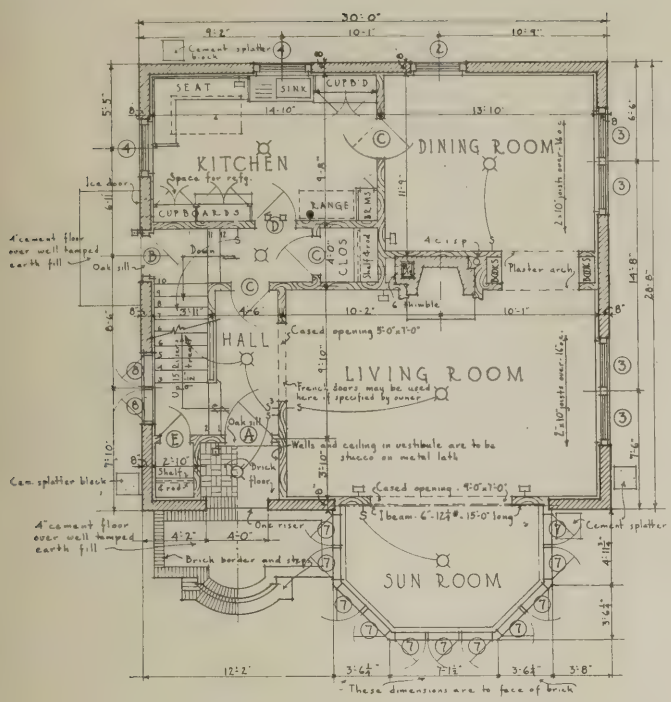
The floor plans have been developed to utilize every bit of floor space, so as to give six good sized rooms with plenty of floor space, and yet have an interesting arrangement. The living room will be an especially beautiful room with its fireplace and the big sun room bay in front. French doors can be used at the hall opening if desired by the owner.

Three corner bedrooms and bath complete the second floor. Each has a good clothes closet. One closet is especially large, with place for the stair ladder to the attic space.

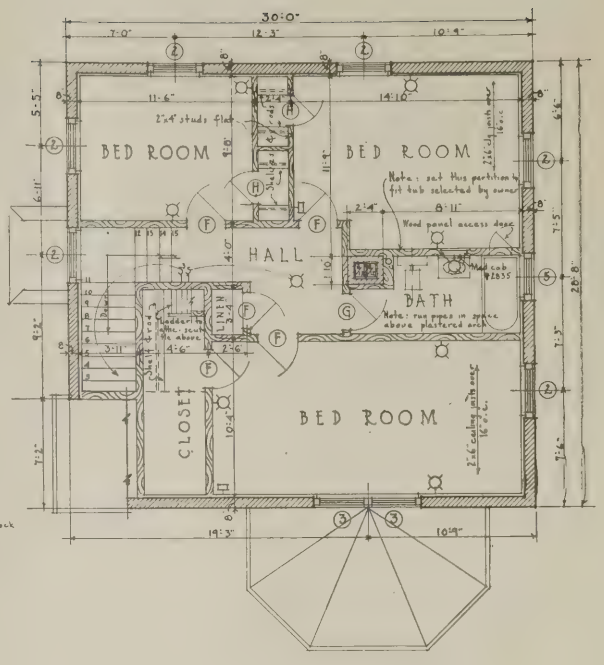
A study of the floor plan will show the many conveniences that make a house attractive and that help to sell or rent it, if built for an investment, and add value to it if built by the owner for his own home.

As designed, it should face south or west, and should be reversed for other facings. Reversed plans are furnished without extra charge.

The regular price of this plan is $30.50. (To NATIONAL BUILDER subscribers $15.50.)

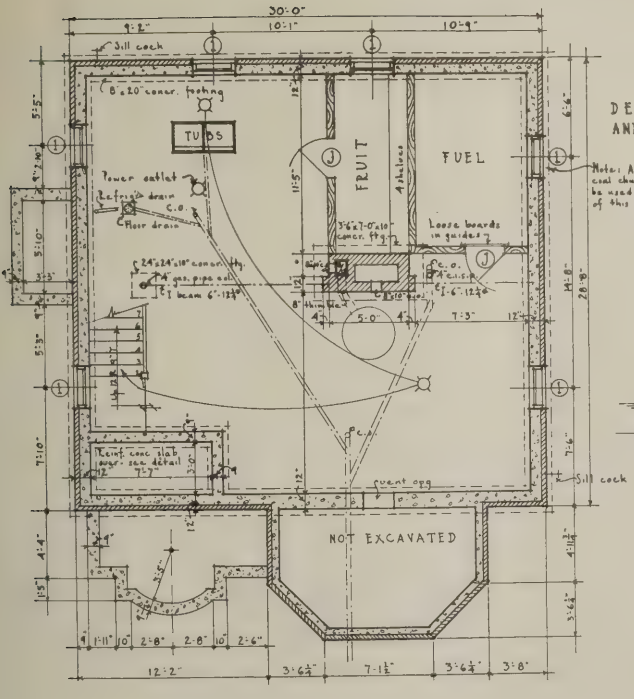


FIRST FLOOR PLAN

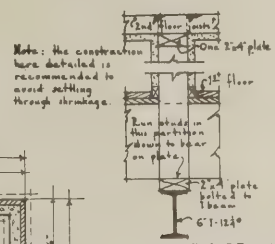


SECOND FLOOR PLAN

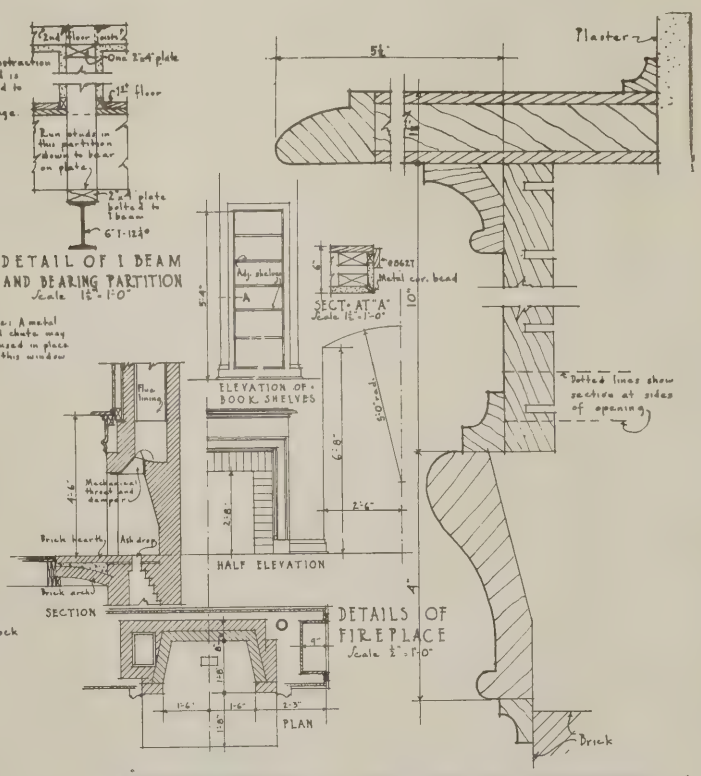
Scale $\frac{1}{4}$" = 1'-0"



BASEMENT PLAN
Scale $\frac{1}{4}$" = 1'-0"


Note: the construction here detailed is recommended to avoid settling through shrinkage.
Run blocks in this partition down to bear on plate
2"x8" plate bolted to I beam
6"I-12¼#

DETAIL OF I BEAM AND BEARING PARTITION
Scale 1½" = 1'-0"



SECT. AT "A"
Scale 1½" = 1'-0"

DETAILS OF FIREPLACE
Scale ½" = 1'-0"

SCHEDULE OF DOORS				
QUAN	TYPE	SIZE	DESCRIPTION	REMARKS
1	A	3'-0"x7'-0"x1¾"	Sea Elem.	Front Entr.
1	D	2'-8"x6'-8"x1¾"	"	Side "
3	C	2'-6"x7'-0"x1⅜"	Unus. 1102	Interior
1	D	2'-8"x7'-0"x1⅜"	"	"
1	E	1'-10"x6'-6"x1⅜"	"	"
5	F	2'-6"x6'-6"x1⅜"	"	"
1	G	2'-4"x6'-6"x1⅜"	"	"
2	H	2'-0"x6'-6"x1⅜"	"	"
2	J	2'-6"x6'-6"x1⅜"	" 710	Cellar

SCHEDULE OF WINDOWS						
QUAN	TYPE	DESCRIPTION	NO. OF LIGHTS	SIZE OF GLASS	SASH OPENING	THICKNESS OF SASH	FRAME
6	1	Cellar Sash	3	8"x10"	2'-4"x1'-3"	1⅜"	See Detail
7	2	Double Hung	12	10"x12"	2'-10"x4'-6"	1⅜"	" "
6	3	DH Mullion	12	10"x12"	2'-10"x4'-6"	1⅜"	" "
2	4	Double Hung	16	8"x10"	3'-0"x3'-10"	1⅜"	" "
1	5	" "	12	8"x10"	2'-4"x3'-10"	1⅜"	" "
2	6	DH Roundtop	8	7"x9"	1'-6"x3'-6"	1⅜"	" "
11	7	Casement	8	10"x12"	2'-0"x4'-5"	1⅛"	" "
2	8	"	4	10"x12"	2'-0"x2'-5"	1⅛"	" "

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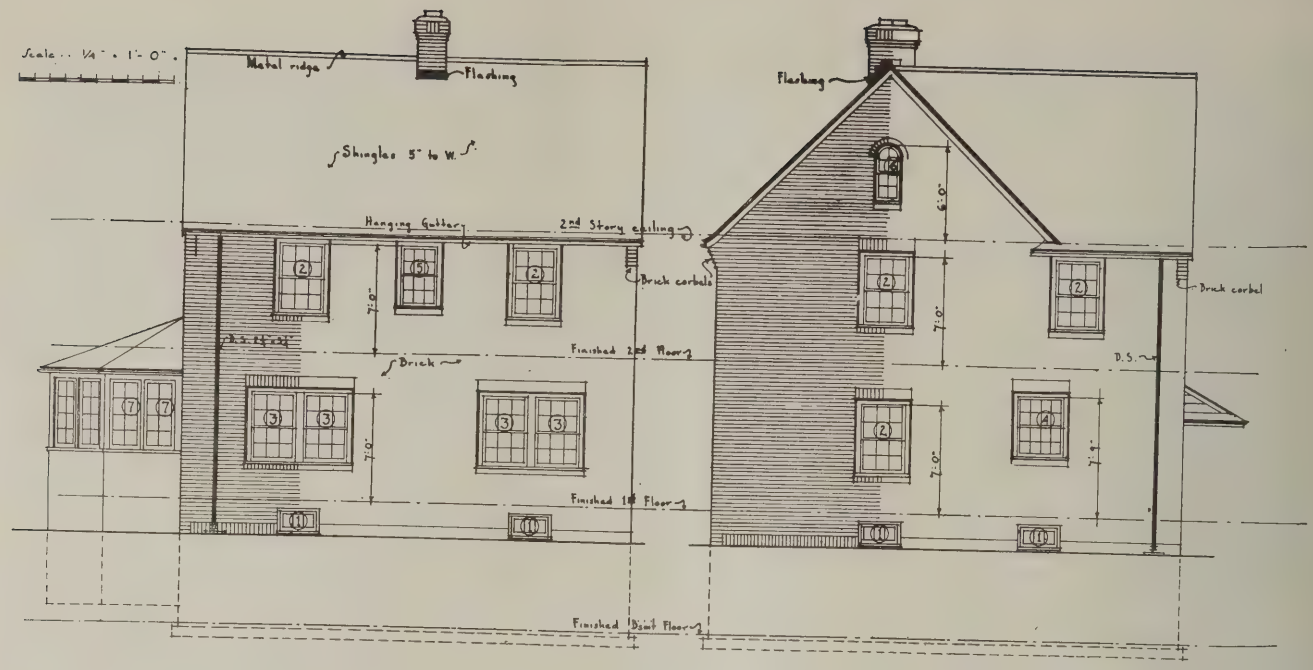
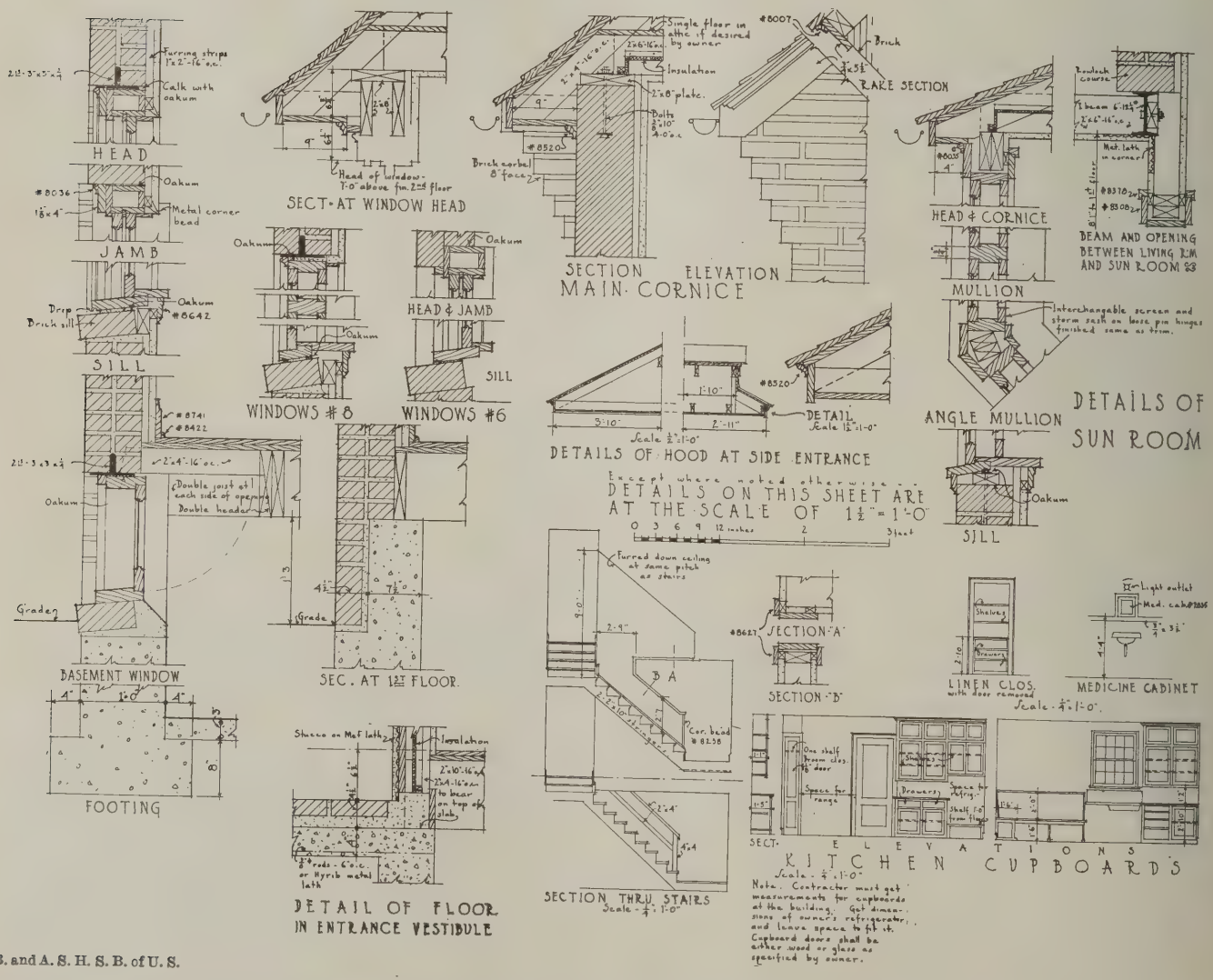
Floor plans, details and door and window schedules for House No. 6A58, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.





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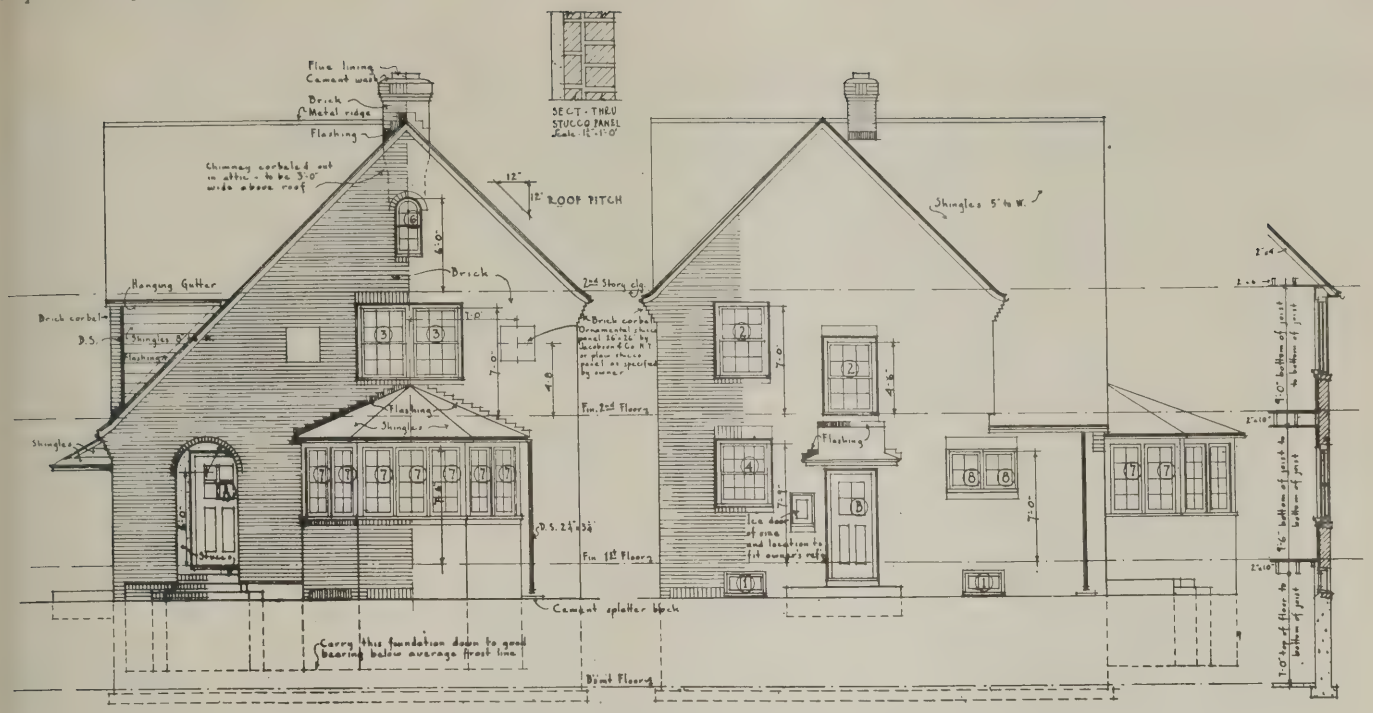
Side and rear elevations and construction details for House No. 6A58, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.



EXCAVATING—230 cu. yd.

BACKFILL—60 cu. yd.

FOUNDATION—If 12″ concrete 59 cu. yd. gravel, 238 sax cement; if 9″ concrete, 50 cu. yd. gravel, 202 sax cement; if 12″ tile, 27000 CBM tile, 19 cu. yd. mortar; if 9″ tile, 22000 CBM tile, 15 cu. yd. mortar.

FACE BRICK—18000 face brick; 15 cu. yd. mortar; 1000 lb. mortar color

COMMON BRICK—17000 common brick or tile; 15 cu. yd. mortar.

CHIMNEY—3000 common brick; 225 face brick; 100 fire brick; 64 lin. ft. flue tile; 16 sq. ft. hearth tile; 20 lb. fire clay; 3 cu. yd. mortar; 1 cast iron ash dump; 1 throat and damper; 1 angle 4x3x¼″—4′0; 2—8x10 cleanouts; 2—6″ adjustable thimbles; 4 yd. metal lath.

CEMENT FLOOR—6 cu. yd. gravel; 4 cu. yd. sand; 62 sax cement.

LATH—11900 wood lath; 9 yd. metal lath.

PLASTER—9 sq. yd. plaster on metal lath; 850 sq. yd. plaster on wood lath; 17 sq. yd. Keene's cement.

TILE FLOORS—45 sq. ft. ceramic tile; 32 lin. ft. cove base.

LUMBER—90 lin. ft. 2x4 basement partition plates; 27—2x4-8 basement partition studs; 300 ft. D&M basement partition sheathing; 3—2x10-14 stair stringers; 12—2x10-9 first floor joist; 48—2x10-14 first floor joist; 6—2x10-14 doubles; 4—2x10-16 headers; 1100 ft. com. bds. first floor subfloor; 1350 ft. 13/16x1½ first floor finish floor; 300 lin. ft. 1x3 bridging; 324 lin. ft. 2x4 first floor partition plates; 94—2x4-9 first floor partition studs; 3—2x10-16 stair horses; 2—2x 14-10 headers; 12—2x6-9 second floor joist; 48—2x10-14 second floor joist; 4—2x10-14 doubles; 3—2x10-16 headers; 950 ft. com. bds. second floor subfloor; 1150 ft. 13/16x1½ second floor finish floor; 360 lin. ft. 2x4 second floor partition plates; 105—2x4-8 second floor partition studs; 16—2x6-11 second floor ceiling joist; 9—2x6-14 second floor ceiling joist; 16—2x6-18 second floor ceiling joist; 9—2x6-14 second floor ceiling joist; 6—2x6-16 doubles and headers; 1000 ft. D&M attic floor 4—2x6-12 rafters; 16—2x4-10 rafters; 25—2x4-16 look outs; 129 lin. ft. 2x8 plates; 24—2x4-16 rafters; 36—2x4-16 rafters; 6—2x4-14 rafters; 3—2x4-12 rafters; 50 lin. ft. 1x6 ridge rafter; 1300 lin. ft. grounds; 129—1x2-9 stripping; 120—1x2-8 stripping; 1800 ft. bds. roof sheathing; 14 M shingles; 16—2x4-16 collar ties and roof braces; 300 ft. shiplap wall sheathing; 8—2x4-16 dormer studs; 200 ft. ceiling; 30—2x4-18 scaffold and extras; 8—2x4-16 scaffold and extras; 6—2x6-16 scaffold and extras; 8—2x8-16 scaffold and extras; 4—2x10-14 scaffold and extras; 4—2x12-16 scaffold and extras.

MILLWORK—Frames: 6—8x10-3L-1⅜; 7—10x12-12L-1⅜; 3 mul. 10x12-12L-1⅜; 2 single 8x10-16L-1⅜; 1 single 8x10-12L-1⅜; 2 single 7x9-8L-1⅜ round heads; 4 mul. 10x12-8L-1⅜ casements; 1 triple 10x12-8L-1⅜ casements; 1 mul. 10x12-4L-1⅜ casements. **Windows:** 6 cellar sash 8x10-3L-1⅜; 7 windows 10x12-12L-1⅜; 6—10x12-12L-1⅜; 2—8x10-16L-1⅜; 1—8x10-12L-1⅜; 2—7x9-8L-1⅜ round heads; 11 casements 10x12-8L-1⅜; 2 casements 10x12-4L-1⅜. **Storm Sash:** 6—8x10-3L-1⅜; 7—10x12-12L-1⅜; 6—10x12-12L-1⅜; 2—8x10-16L-1⅜; 1—8x10-12L-1⅜; 2—7x9-8L-1⅜ round heads; 11—10x12-8L-1⅜; 2—10x12-4L-1⅜. **Screens:** 6—8x10-3L-1⅜; 7—10x12-12L-1⅜; 6—10x12-12L-1⅜; 2—8x10-16L-1⅜; 1—8x10-12L-1⅜; 2—7x9-8L-1⅜ round heads; 11—10x12-8L-1⅜; 2—10x12-4L-1⅜. **Outside Door Frames:** 1—3′0x7′0-1¾; 1—2′8x6′8-1¾; 1 icing door frame. **Outside Doors:** 1—3′0x7′0-1¾; 1—2′8x6′8-1¾; 1 icing door. **Storm Doors:** 1—3′0x7′0-1⅛; 1—2′8x6′8-1⅛. **Screen Doors:** 1—3′0x7′0-1⅛; 1—2′8x6′8-1⅛. **Outside Millwork:** 206 lin. ft. cornice. **Interior Doors:** 3—2′6x7′0-1⅜ (No. 1102); 1—2′8x7′0-1⅜ (No. 1102); 1—1′10x6′6-1⅜ (No. 1102); 5—2′6x6′6-1⅜ (No. 1102); 1—2′4x6′6-1⅜ (No. 1102); 2—2′0x6′6-1⅜ (No. 1102); 2—2′6x 6′6-1⅜ (No. 710). **Jambs:** 3—2′6x7′0; 1—2′8x 7′0; 1—1′10x6′6; 5—2′6x6′6; 1—2′4x6′6; 2—2′0x 6′6; 2—2′6x6′6; 1—9′0x7′0; 1—5′0x7′0. **Interior Trim:** 6 side 8x10-3L; 7 side 10x12-12L; 3 side mul. 10x12-12L; 2 side single 8x10-16L; 1 side single 8x10-12L; 2 side single 7x9-8L round head; 4 side mul. 10x12-8L; 1 side triple 10x12-8L; 1 side mul. 10x12-4L; 1 side door 3′0x7′0; 1 side door 2′8x6′8; 1 side icing door; 6 side 2′6x7′0; 2 side 2′8x7′0; 2 side 1′10x6′6; 10 side 2′6x6′6; 2 side 2′4x6′6; 4 side 2′0x6′6; 4 side 2′6x6′6; 2 side 9′0x7′0; 2 side 5′0x7′0; 1 flight basement stairs with rail; 1 flight main stairs with rail; 1 flight attic steps with rail; 1 flight grade entrance steps; 1 medicine cabinet (No. 2835); 1 scuttle door jamb; 1 scuttle door trim; 1 scuttle door side trim; 1 utility door; 1 utility door jamb; 1 utility door side trim; 1 mantel shelf; 2 book cabinets; 1 broom closet; 1—4′0 kitchen cabinet; 1 corner seat; 1 table; 1—6′0 cupboard; 650 lin. ft. base; 650 lin. ft. base shoe; 650 lin. ft. base molding; 40 lin. ft. shelving; 40 lin. ft. hook strip; 24 lin. ft. clothes rod; 350 lin. ft. picture molding; 134 lin. ft. ceiling cove; 45 lin. ft. chair rail; 6 lin. ft. threshold; 1 linen closet.

INSULATION—900 ft. ½″ vegetable fibre or equal—ceiling; 1700 ft. ½″ vegetable fibre or equal—walls; 4 rolls felt—floors; 5 rolls felt—roof.

WEATHER STRIPPING—6 sash 8x10-3L; 13 windows 10x12-12L; 2 windows 8x10-16L; 1 window 8x10-12L; 2 windows 7x9-8L; 11 sash 10x 12-8L; 2 sash 10x12-4L; 1 door 3′0x7′0; 1 door 2′8x6′8.

CAULKING—18 single frames; 8 mullion frames; 1 triple frame; 2 doors; 1 icing door; 1 coal chute.

TINWORK—98 lin. ft. gutter; 20 gutter hangers; 4 elbows; 4 offsets; 4 nipples; 4 strainers; 12 gutter ends; 60 lin. ft. conductor pipe; 12 conductor hooks; 50 lin. ft. ridge roll; 3 finials; 40 lin. ft. valley tin; 24 lin. ft. flashing tin; 200 tin shingles.

REINFORCING STEEL—8—⅜ rods, 7′0; 8—⅛ rods, 11′0.

STEEL—1—4″ gas pipe column 8′0; 1—6″ I-beam, 12¼ lb., 12′0; 1—6″ I-beam, 12¼ lb., 8′0; 24 joist anchors; 20—⅜x10″ bolts; 1 beam, 6″, 12¼ lb., 15′0.

LINTELS—6 for sash 8x10-3L; 7 for windows 10x12-12L; 2 for windows 8x10-16L; 1 for windows 8x10-12L; 3 for mul. 10x12-12L; 4 for mul. 10x12-8L; 1 for triple 10x12-8L; 1 for mul. 10x 12-4L; 1 for door 3′0x7′0; 1 for door 2′8x6′8; 1 for icing door.

HARDWARE—6 cellar sash sets; 18 sash locks; 18 sash lifts; 13 casement sash sets; 37 storm sash sets; 37 screen sash sets; 1 front door set with butts; 1 rear door set with butts; 1 icing door set with butts; 2 storm door sets with butts; 2 screen door sets with butts; 1 floor hinge; 2 push plates; 14 inside door sets with butts; 18 door bumpers; 4 doz. clothes hooks; 4 stair rail brackets; 900 lb. nails; 1 coal chute; 6 lb. brads; 510 lb. sash weights; 4 hanks sash cord; for medicine cabinet: 1 pr. ornamental butts, 1 cupboard turn; 1 pr. hinges for scuttle door; 4 friction stays for utility door; 2 pr. hinges for seat; for kitchen cabinet: 5 pr. ornamental butts, 3 cupboard turns, 2 blind catches, 4 drawer pulls; for cabinet: 10 pr. ornamental butts, 5 elbow catches, 5 cupboard turns, 2 drawer pulls; for broom closet: 2 ornamental butts, 1 cupboard turn; for linen closet: 3 drawer pulls.

EXTERIOR PAINTING—4 gal. trim paint; 42 gal. shingle stain; 1 gal. oil; 1 qt. shellac; 1 gal. sash color; 1 gal. screen color.

INTERIOR PAINTING—9 gal. white paint; 7 gal. enamel; 3½ gal. filler stain; 1½ gal. shellac; 5 gal. varnish; 2 gal. floor shellac; 5 gal. floor varnish; 1 gal. oil; 1 gal. japan; 10 lb. putty; 1 doz. sheets sandpaper; 3 packages steel wool.

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Front and side elevations and quantity survey for House No. 6A58, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.

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"A Lot of House for the Money"

House No. 6A57, designed especially for National Builder by the Northwestern Division of The Architects' Small House Service Bureau of the United States, Inc.

MANY builders regard the Colonial as the most economical type of house to build, as its simple form and construction provide against waste of materials or space. In communities or real estate sections where there is much building going on, the number of Colonial houses built or under construction attest to the steady popularity of this sterling type. It gives "a lot of house for the money."

In the house illustrated here a touch of individuality has been given the exterior through the use of a combination of materials. The stucco and shingle treatment is decidedly attractive. The open lattice porch of the design may be screened or glazed. It may be built at the rear if desired.

The central hall allows the living room to occupy one-half the house and run from front to back, giving a wonderfully fine room.

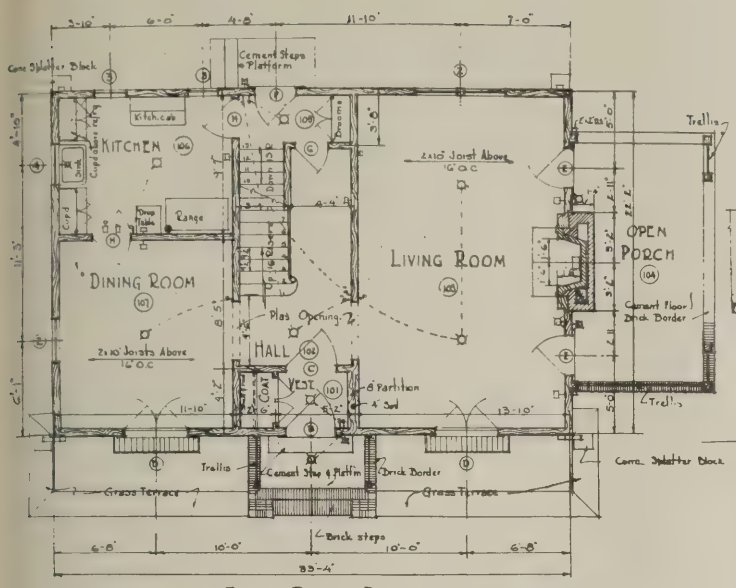
The dining room is pleasantly located in a front corner. Back of it, conveniently placed, is the light, airy kitchen, well provided with built-in cupboards and arranged for convenience.

Upstairs are three good bedrooms with cross ventilation and good closets.

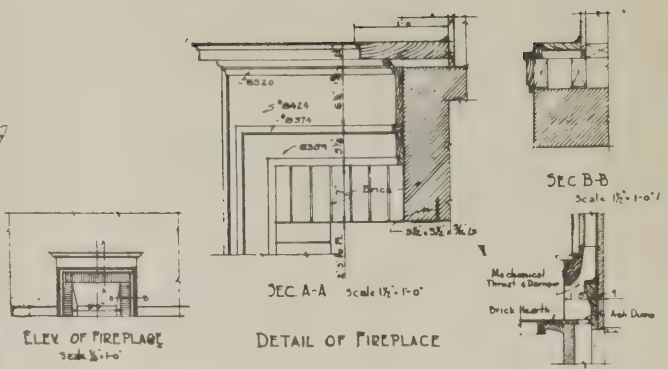
The design is similar to 6A54 with brick veneer exterior published in the June issue, but this new design has full two-story height in the bedroom, and a porch at the side.

As shown, it will require a lot with 45-foot frontage. It is designed to face north or west, and should be reversed for other facings. Reversed plans are supplied without extra charge.

The regular price of this plan is $30.50. (To NATIONAL BUILDER subscribers $15.50.)

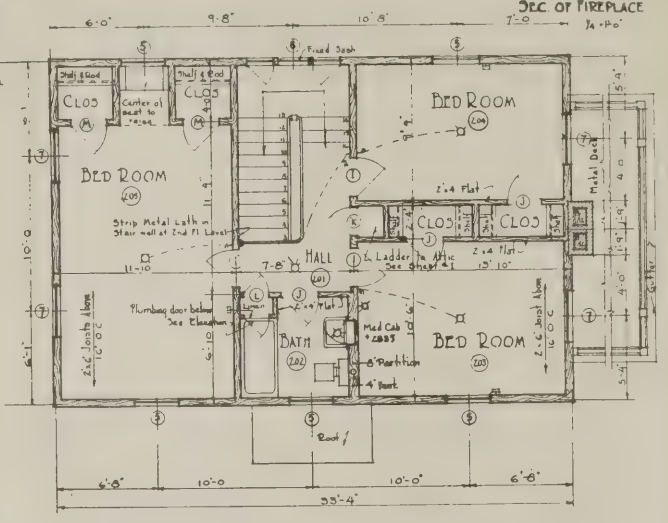


FIRST FLOOR PLAN

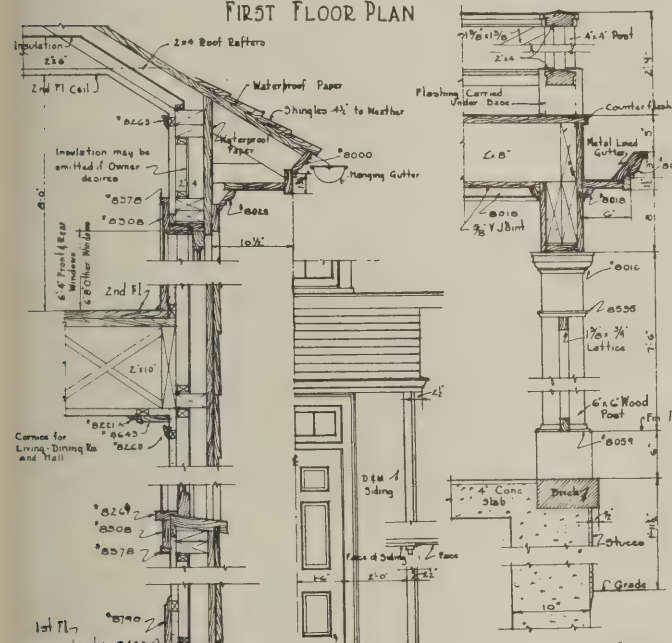


DETAIL OF FIREPLACE

SEC. OF FIREPLACE

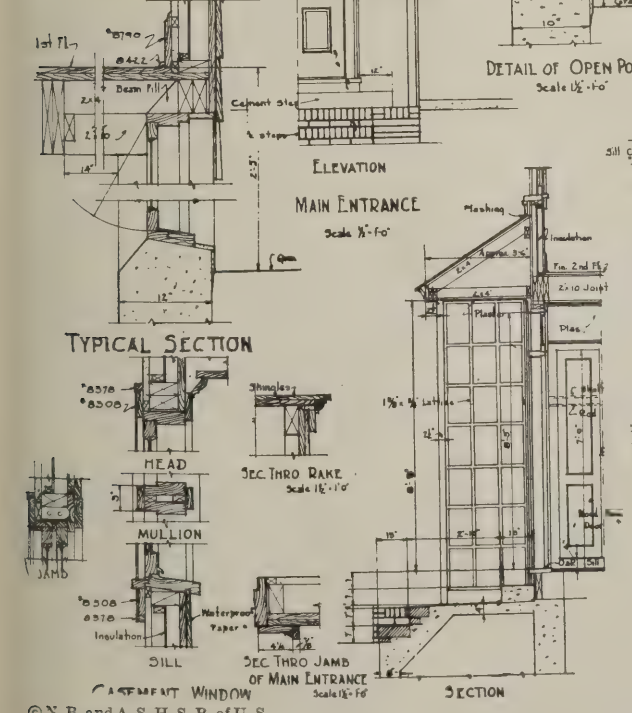


SECOND FLOOR PLAN

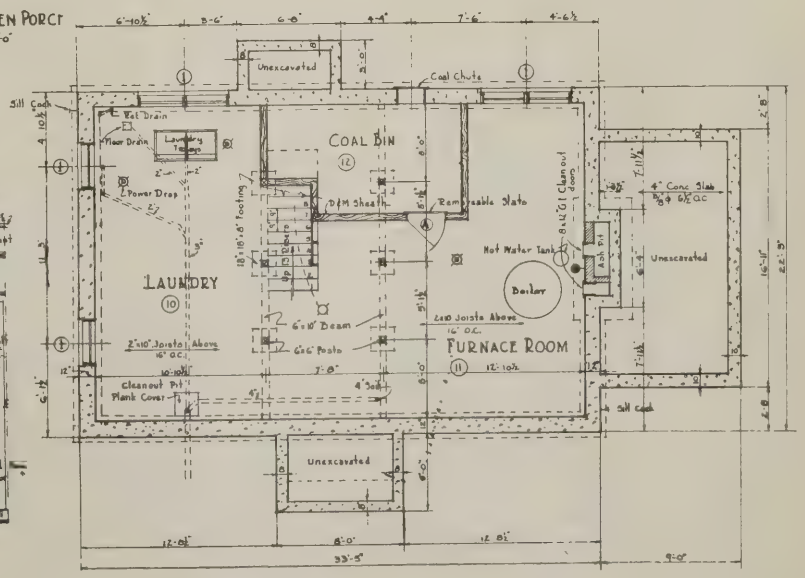


DETAIL OF OPEN PORCH
Scale 1½"-1'-0"

ELEVATION
MAIN ENTRANCE
Scale ½"-1'-0"



TYPICAL SECTION



BASEMENT PLAN
Scale ¼"-1'-0"

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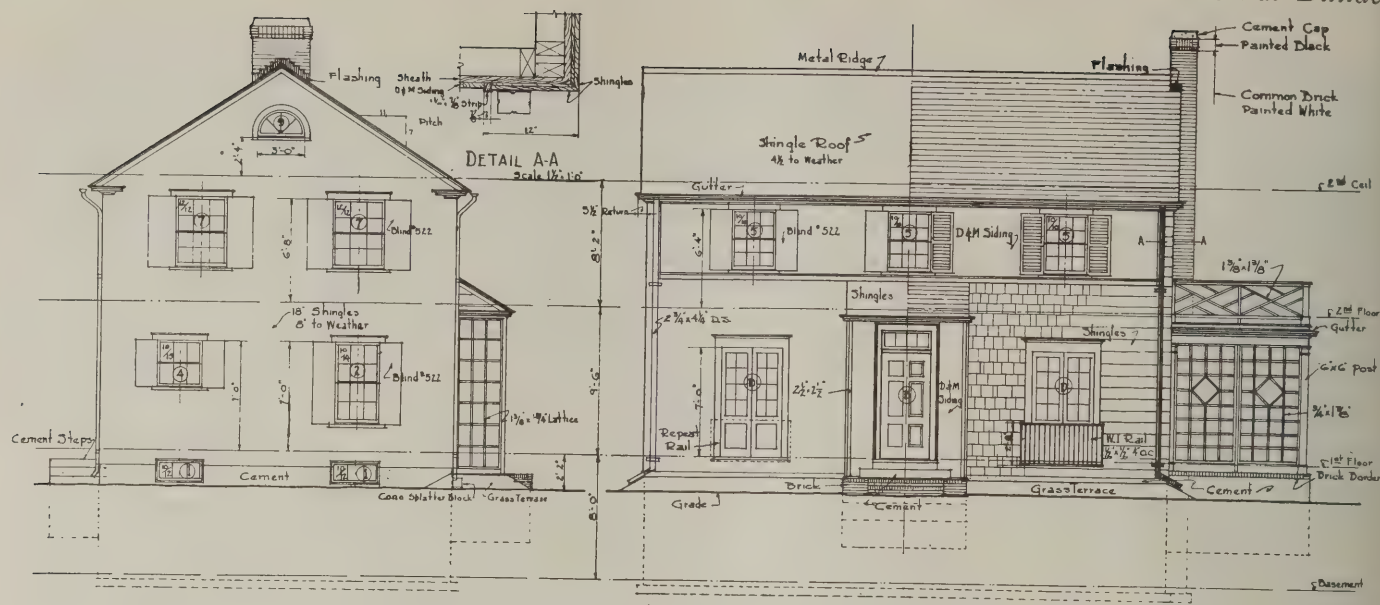
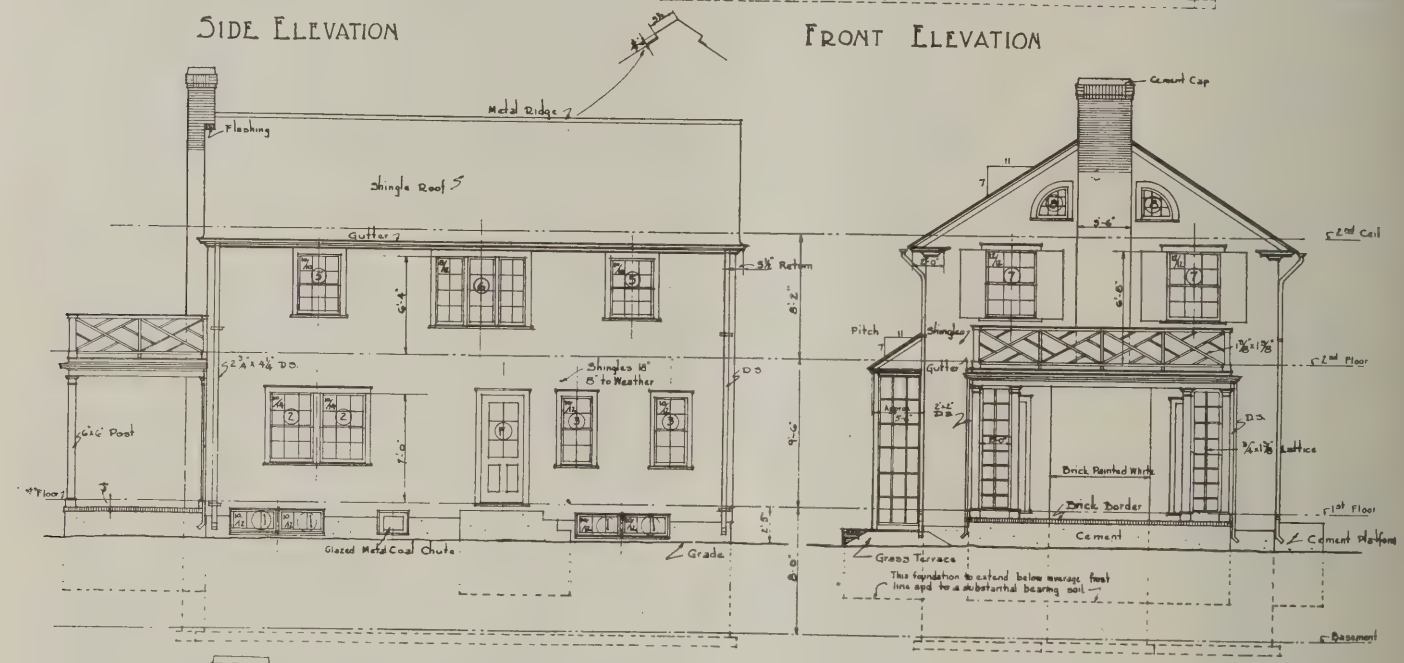
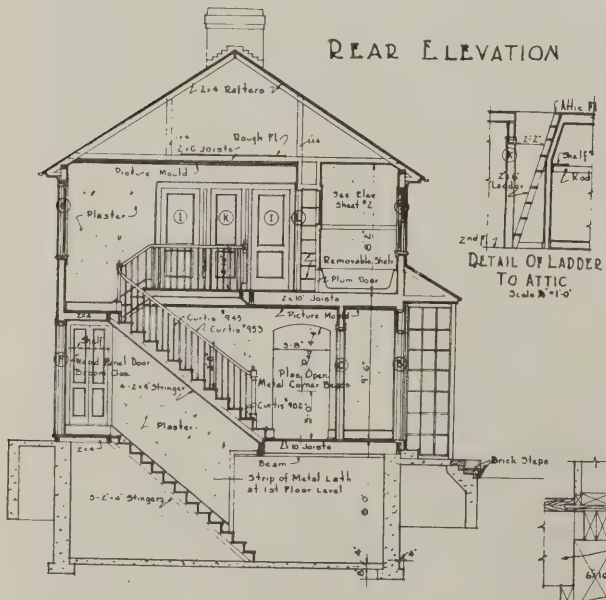
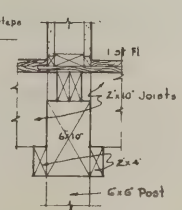
Floor plans and details for House No. 6A57, designed es pecially for National Builder by the Northwestern Division of The Architects' Small House Service Bureau of the United States, Inc.







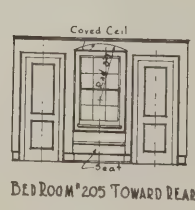


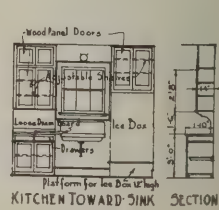
SCHEDULE OF WINDOWS

QUANTITY	TYPE	DESCRIPTION	NO. OF LIGHTS	SIZE GLASS	SIZE OF OPNG FOR DASH	THICKNESS DASH	FRAME
6	1	Basement	3	10x12	2-10 - 1-5	1⅜	See Detail
3	2	Double Hung	12	10x14	2-10½ x 5'-2"	"	"
2	3	" "	8	10x12	2-1" x 4'-6"	"	"
1	4	" "	6	10x18	2-10½"-3-0	"	"
5	5	" "	12	10x30	2-10½"-3-10	"	"
3	6	Casement	8	8x16	1-9 x 3-9	1¾	"
4	7	Double Hung	12	12x12	3-4½ x 4-6	1⅜	"
2	8	Gable #302				1⅞	Plank
1	9	" #285				"	"

SCHEDULE OF DOORS

QUANTITY	TYPE	SIZE	DESCRIPTION	REMARKS
1	A	2'-6" x 6'-8" x 1⅜	Univ #720	5 Panel
1	B	3'-0" x 6'-8" x 1¾	Curtis #222	Front
1	C	5'-0" 7'-0" x 1¾	Univ #1608	Vest
4	D	2'-0" 7'-0" x 1⅜		French
2	E	2'-6" 7'-0" x 1⅜		Porch
1	F	2'-8" x 7'-0" x 1⅜		Rear
1	G	2'-0" x 7'-0" x 1⅜	Univ #1102	Interior
2	H	2'-6" x 7'-0" x 1⅜	" "	"
3	I	2'-6" x 6'-6" x 1⅜	" "	"
3	J	2'-4" x 6'-6" x 1⅜	" "	"
1	K	2'-0" x 6'-6" x 1⅜	" "	"
1	L	1'-8" x 6'-6" x 1⅜	" "	"
2	M	2'-2" x 6'-6" x 1⅜	" "	"





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'Elevations, details and window and door schedules of House No. 6A57, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.

EXCAVATING—196 cu. yd.
BACKFILL—60 cu. yd.
FOUNDATION—If 12″ concrete, 51 cu. yd. gravel, 206 sax cement; if 9″ concrete, 42 cu. yd. gravel, 170 sax cement; if 12″ tile, 24400 CBM tile, 18 cu. yd. mortar; if 9″ tile, 19800 CBM tile, 15 cu. yd. mortar; 400 face brick.
CEMENT FLOOR—6 cu. yd. gravel; 4 cu. yd. sand; 68 sax cement; 4 spatter blocks.
CHIMNEY—2500 common brick; 440 face brick; 120 fire brick; 60 lin. ft. flue tile 8x12; 12 sq. ft. hearth tile; 20 lb. fire clay; 3 cu. yd. mortar; 1 cast-iron ash dump; 1 throat and damper; 1 angle 4x3x5/16-4′0; 2—8x12 cleanout doors; 2—6″ adjustable thimbles; 3 sq. yd. metal lath.
LATH—9 sq. yd. metal over boiler; 7000 wood lath.
PLASTER—9 sq. yd. plaster on metal lath; 25 sq. yd. plaster on concrete; 688 sq. yd. plaster on wood lath; 14 sq. yd. Keene's cement.
TILE FLOORS—42 sq. ft. ceramic tile; 24 lin. ft. cove base.
LUMBER—6—6x6-7 posts; 42 lin. ft. 6x10 beams; 84 lin. ft. 2x4 beams ribbon; 84 lin. ft. 2x4 beams plates; 4 ft. of plank cleanout cover; 3—2x4-14 basement stair horses; 84 lin. ft. 2x4 basement partition plates; 22—2x4-7 basement partition studs; 280 ft. D & M basement partition sheathing; 18—2x10-14 first floor joist; 18—2x10-20 first floor joist; 46 lin. ft. 2x10 box sill; 4—2x10-14 doubles; 2—2x10-16 headers; 834 ft. com. bds. first floor subfloor; 1040 ft. 13/16x1½ first floor finish floor; 280 lin. ft. 1x3 bridging; 900 lin. ft. grounds; 4—2x4-18 stair horses to second floor; 222 lin. ft. 2x4 first floor partition plates; 66—2x4-9 first floor partition studs; 18—2x10-14 second floor joist; 18—2x10-20 second floor joist; 4—2x10-14 second floor joist doubles; 2—2x10-16 second floor joist headers; 770 ft. com. bds. second floor subfloor; 970 ft. 13/16x1½ second floor finish floor; 306 lin. ft. 2x4 second floor partition plates; 84—2x4-8 second floor partition studs; 26—2x6-22 second floor ceiling joist; 44 lin. ft. 1x3 ribbon; 300 ft. D & M partial attic floor; 324 lin. ft. 2x4 outside wall plates; 80—2x4-18 outside wall studs; 10—2x4-16 gable studs; 52—1x4-5 rafter braces; 52—2x4-16 rafters; 34 lin. ft. 1x6 ribbon rafter; 4—2x8-9 porch girders; 2—2x8-16 porch girders; 13—2x6-9 porch rafters; 13—2x4-9 porch ceiling joist; 160 ft. ⅝x4 porch ceiling; 200 ft. D & M porch roof sheathing; 1260 ft. com. bds. roof sheathing; 10½ M shingles; 25—2x4-16 lookouts; 2200 ft. shiplap wall sheathing; 6—2x4-4 porch rafters; 3—2x4-12 porch ceiling joist; 3—2x6-16 porch girders; 10½ M shingles wall sheathing; 840 ft. D & M siding wall sheathing; 280 ft. ceiling cornice; 25—2x4-16 scaffold and extras; 8—2x6-14 scaffold and extras; 6—2x8-16 scaffold and extras; 3—2x10-14 scaffold and extras; 4—2x12-12 scaffold and extras.
MILLWORK—**Frames:** 2 single 10x12-3L-1⅜; 2 mul. 10x12-3L-1⅜; 1 mul. 10x14-12L-1⅜; 1 single 10x14-12L-1⅜; 2 single 10x12-8L-1⅜; 1 single 10x15-6L-1⅜; 5 single 10x10-12L-1⅜; 1 triple casement 8x12-8L-1¾; 4 single wd. 12x12-12L-1⅜; 2 gable sash (No. 302); 1 gable sash (No. 283). **Windows:** 6 sash 10x12-3L-1⅜; 3 windows 10x14-12L-1⅜; 2—10x12-8L-1⅜; 1—10x15-6L-1⅜; 5—10x10-12L-1⅜; 3 casements 8x12-8L-1¾; 4 windows 12x12-12L-1⅜; 2 gable sash (No. 302); 1 gable sash (No. 283). **Storm Sash:** 6—10x12-3L-1⅜; 3—10x14-12L-1⅜; 2—10x12-8L-1⅜; 1—10x15-6L-1⅜; 5—10x10-12L-1⅜; 3—8x12-8L-1⅜; 1—4—12x12-12L-1⅜. **Screens:** 6—10x12-3L-1⅜; 3—10x14-12L-1⅜; 2—10x12-8L-1⅜; 1—10x15-6L-1⅜; 5—10x10-12L-1⅜; 3—8x12-8L-1⅜; 4—12x12-12L-1⅜; 2 (No. 302); 1 (No. 283). **Shutters:** 1 pr. for 10x14-12L wd.-1⅛; 1 pr. for 10x15-6L wd.-1⅛; 3 pr. for 10x10-12L wd.-1⅛; 4 pr. for 12x12-12L wd.-1⅛. **Outside Door Frames:** 1—3′0x6′8-1¾ with transom; 1—2′8x7′0-1¾; 2—2′6x7′0-1¾; 2 double opening 4′0x7′0-1¾. **Outside Doors:** 1—3′0x6′8-1¾ C220; 1—2′8x7′0-1¾ Detail; 2—2′6x7′0-1¾ Detail; 4—2′0x7′0-1¾ French; 2 astragals for 7′0 doors. **Storm Doors:** 1—3′0x6′8-1⅛; 1—2′8x7′0-1⅛; 2—2′6x7′0-1⅛; 2 pr. opening 4′0x7′0-1⅛. **Screen Doors:** 1—3′0x6′8-1⅛; 1—2′8x7′0-1⅛; 2—2′6x7′0-1⅛; 2 pr. opening 4′0x7′0. **Outside Millwork:** 108 lin. ft. belt; 108 lin. ft. water drip; 190 lin. ft. cornice; 6 porch columns; 2 half columns; 34 lin. ft. deck rail and posts; 46 lin. ft. porch facia; 46 lin. ft. porch soffit; 46 lin. ft. porch inside facia; 2 lattice strips 2′0x8′6; 2 lattice strips 2′6x10′0; 1 lattice strip 8′0x7′6; 1 transom 3′0x1′2-1¾; 1 screen 3′0x1′2-1⅛; 1 st. sh. 3′0x1′2-1⅛. **Interior Doors:** 1—2′6x6′8-1⅜ (No. 720); 1—3′0x7′0-1¾ (No. 1605); 1—2′0x7′0-1⅜ (No. 1102); 2—2′6x7′0-1⅜ (No. 1102); 3—2′6x6′6-1⅜ (No. 1102); 3—2′4x 6′6-1⅜ (No. 1102); 1—2′0x6′6-1⅜ (No. 1102); 1—1′8x6′6-1⅜ (No. 1102); 2—2′2x6′6-1⅜ (No. 1102). **Jambs:** 1—2′6x6′8; 1—3′0x7′0; 1—2′0x7′0; 2—2′6x7′0; 3—2′6x6′6; 3—2′4x6′6; 1—2′0x6′6; 1—1′8x6′6; 2—2′2x6′6. **Interior Trim:** 2 sides single 10x12-3L; 2 sides mul. 10x12-3L; 1 side mul. 10x14-12L; 1 side single 10x14-12L; 2 sides single 10x12-8L; 1 side single 10x15-6L; 5 sides single 10x10-12L; 1 side triple case 8x12-8L; 4 sides single wd. 12x12-12L; 2 sides gable sh. (No. 302); 1 side gable sh. (No. 283); 1 side dr. 3′0x6′8 with tr.; 1 side dr. 2′8x7′0; 2 side dr. 2′6x7′0; 2 side double dr. opening 4′0x7′0; 2 side door 2′6x6′8; 2 side door 3′0x7′0; 2 side door 2′0x7′0; 4 side door 2′6x7′0; 6 side door 2′6x6′6; 6 side door 2′4x6′6; 2 side door 2′0x6′6; 2 side door 1′8x6′6; 4 side door 2′2x6′6; 1 flight basement stairs; 1 flight grade stairs; 1 flight main stairs with rail; 1 ladder to attic; 1 medicine cabinet (No. 2835); 1 linen cabinet; 1 utility door, jamb and 1 side trim; 1 bedroom seat; 1 mantel shelf; 1 broom cabinet; 1 kitchen cabinet; 1 drop table; 2—3′0 cabinets; 520 lin. ft. base; 520 lin. ft. base shoe; 520 lin. ft. base molding; 312 lin. ft. picture molding; 162 lin. ft. ceiling cove; 18 lin. ft. closet shelving; 18 lin. ft. closet hook strip; 28 lin. ft. panel molding; 18 lin. ft. closet clothes rod; 20 lin. ft. threshold; 1 coat cabinet; 1 drainboard; 1 scuttle door jamb and trim. **Note:** If dining and living room trim is changed it will affect the following above listed items: 1 door 3′0x6′8-1¾ (No. C220); 1 side trim 3′0x6′8; 1 dr. 3′0x7′0-1¾ (No. 1605); 1 jamb 3′0x7′0; 2 side trim 3′0x7′0; 1 coat cabinet; 1 door 2′0x7′0-1⅜ (No. 1102); 1 side trim 2′0x7′0; 1 door 2′6x7′0-1⅜ (No. 1102); 1 side trim 2′6x 7′0; 1 flight main stairs with rail; 1 mantel shelf; 4 doors 2′0x7′0-1¾ French; 2 side trim 4′0x7′0; 2 astragals; 2 dr. 2′6x7′0-1¾ Detail; 2 side trim 2′6x7′0; 1 side trim for single wd. 10x14-12L; 1 side trim for mul. wd. 10x14-12L; 150 lin. ft. base; 150 lin. ft. base shoe; 150 lin. ft. base molding; 162 lin. ft. ceiling cove; 162 lin. ft. picture molding; 880 ft. 13/16x1½ finish flooring.
TINWORK—180 sq. ft. tin deck; 34 lin. ft. ridge roll; 1 finial; 10 lin. ft. chimney flashing; 118 lin. ft. gutter; 30 gutter hangers; 8 gutter ends; 4 miters; 6 nipples; 6 strainers; 6 elbows; 6 offsets; 6 shutoffs; 96 lin. ft. conductor; 12 conductor hooks; 200 tin shingles.
HARDWARE—6 cellar sash sets; 15 sash locks; 15 sash lifts; 1 casement sash set; 3 gable sash sets; 27 storm sash sets; 27 screen sash sets; 9 sets shutter hardware for pair; 2 front door sets with butts; 2 rear door sets with butts; 2 double door sets with butts; 4 storm door sets for single; 2 storm door sets for double; 4 screen door sets for single; 2 screen door sets for double; 1050 lb. assorted nails; 6 lb. assorted brads; 450 lb. sash weights; 1 coal chute; 4 doz. clothes hooks; 4 stair rail brackets; 1 floor hinge; 2 push plates; 14 inside lock sets with butts; 1 pr. hinges for attic ladder; for medicine cabinet: 1 pr. ornamental butts, 1 cupboard turn; for linen cabinet: 1 cupboard turn, 1 pr. ornamental butts; 4 friction stays—utility door; 1 pr. hinges for bedroom seat; 1 transom sash lift; 1 pr. transom hinges; for broom closet: 2 pr. hinges, 1 blind catch, 1 cupboard turn; 1 pr. drop leaf hinges; for ice box cabinet: 2 pr. ornamental butts, 1 cupboard turn, 1 blind catch; for kitchen cabinet: 6 pr. ornamental butts, 3 cupboard turns, 3 elbow catches, 2 drawer pulls; 3 hanks sash cord; 1 pr. hinges for scuttle door.
INSULATION—3 rolls felt for roof; 5 rolls felt for walls; 3 rolls felt for floors; 1800 ft. ½″ vegetables fiber or equal for wall insulation; 700 ft. ½″ vegetable fiber or equal for ceiling insulation.
WEATHER STRIPPING—6 sash 10x12-3L; 3 windows 10x14-12L; 2 windows 10x12-8L; 1 window 10x15-6L; 5 windows 10x10-12L; 3 sh. 8x12-8L; 4 windows 12x12-12L; 2 sh. (No. 302); 1 sh. (No. 283); 1 dr. 3′0x6′8; 1 dr. 2′8x7′0; 2 dr. 2′6x7′0; 2 openings 4′0x7′0.
CAULKING—18 single frames; 3 mullion frames; 1 triple frame; 4 single door frames; 2 double door frames; 1 chimney; 1 coal chute.
REINFORCING STEEL—32—⅜ round rods, 9′0.
EXTERIOR PAINTING—½ gal. brick paint; 4 gal. trim paint; ½ gal. metallic paint; 30 gal. roof stain; 30 gal. body stain; 4 gal. body paint; 1 gal. oil; 1 qt. shellac; 1 gal. sash color; 1 gal. screen color.
INTERIOR PAINT—10 gal. white; 7 gal. enamel; 3½ gal. filler stain; 2 gal. shellac; 5 gal. varnish; 3 gal. floor shellac; 4 gal. floor varnish; 1 gal. oil; 1 gal. japan; 10 lb. putty; 2 doz. sheets sandpaper; 2 lb. steel wool.

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Quantity survey for House No. 6A57, designed especially for National Builder by the Northwestern Division of The Architects' Small House Service Bureau of the United States, Inc.

A 350-Year Old Weather Vane

WIDE interest attaches to the 350th birthday of the old Copper Dragon of the Church of St. Mary-Le-Bow, Cheapside, London, not only because of the age and historic interest of this old relic, which is still in active service, but because its present birthday marks a renaissance of the copper weathercock in this country. The increasing use of the weathercock on our larger buildings is ascribed for the most part to the growing use of the tower in architecture. This, in turn, is attributed to the present architectural tendency toward the "set-back" type of building with the upper stories receding, as distinguished from the "straight-front" type of skyscraper.

The Copper Dragon of St. Mary's was placed in use in 1573, during the reign of "Good Queen Bess."

From its lofty perch 221 feet above the sidewalk, it has looked down upon, and indeed participated in, many strange episodes in London life. Besides rendering faithful service through the changing winds of centuries, it has served as a symbol of the city of London itself, for 350 years ago, when it was first put up, the crest of the city was represented by the Cross of St. George emblazoned on the wing of a

This weathervane is 8 feet 6 inches long and is made of sheet copper

dragon, just as it is there represented today.

This quaint copper dragon saw the rise and fall of Oliver Cromwell, the coming and passing of the Revolution and the Great Interregnum. It survived unscathed the Great Fire of London in 1666, so realistically described in the diary of Samuel Pepys. It swayed to and fro violently, perhaps in ill omen, when George III and Lord North matured their vain tyrannical plans against the budding American republic.

The dragon is made of sheet copper and is 8 feet 6 inches long. It has been taken down for regilding on four different occasions, but the copper itself has withstood the elements unharmed.

It has been the subject of many legends and prophecies, the most interesting of which is perhaps that which has been erroneously attributed to Mother Shipton, a famous seer, to the effect that if this Dragon and the Grasshopper from the vane of the Royal Exchange met, the streets of London would flow with blood. In 1820 the two "insects" were both taken down for repair and met at a workshop in the neighborhood of St. Luke's Lunatic Asylum. Blood, however, did not flow, although the times were parlous enough, as England was still suffering from the severe economic depression resulting from the Napoleonic wars.

Where the Contractor Needs Only to "Pull the Trigger" to Get Business

How the D. J. Peterson Lumber Company, Toledo, Ohio, Co-operate With Their Contractors and Builders in Securing Business and in Building Better Types of Houses

IT is said that when the Prince of Wales goes hunting they lay out his hunting clothes and hat, oil his guns and escort him to a comfortable place in the woods at the end of a runway. Lackeys stand behind him to load his gun and pass it to him when it is time to shoot. Out in the woods beaters with horses and dogs round up the game and chase it toward the prince's stand. When the game breaks into view a lackey hands over a gun, BUT —the prince has to pull the trigger!

Main office and plant of the D. J. Peterson Lumber Company, Toledo, Ohio, originators of a unique scheme of co-operation with their contractor customers which gets business for all

Nobody can call a contractor a prince and get away with it. But there is a certain similarity in what is done for the Prince of Wales when hunting and what is done by the lumber dealer who is the subject of the following article, for the contractor who is looking for business. This lumber dealer goes out and rounds up the business, drives it down the runway, loads the contractor's gun and hands it to him. All the contractor has to do is pull the trigger.

The D. J. Peterson Lumber Company is one of the leading lumber dealers in Toledo, Ohio. This concern has been in the retail business only a little over three years, but they have long been established as a wholesaler in lumber. Perhaps that is the reason why they have been so aggressive in their merchandising methods—they have had no precedents to hold them back and no traditions to bow down to. Instead, they have had a clean slate to write on and have felt free to draw their plans in the way they thought was right. Mr. J. H. Peterson, or Harold Peterson, as he is known among lumber dealers and his local contractors, is the general manager of this concern. He grew up in the lumber business and has made a scientific study of lumber. He is a graduate of the Biltmore Forest School, and holds a degree of Bachelor of Forestry from Darmstadt, Germany.

High up in the creed of the D. J. Peterson Lumber Company is recognition of the importance of the contractor in the building industry. Mr. Peterson is not simply a believer in the policy of "live and let live" but he understands the economic relation between the lumber dealer and the contractor. He does not attempt to do any building himself, nor does his concern operate a building department.

Another policy of the D. J. Peterson Lumber Company is that of selling only nationally advertised materials. There are two reasons why they have adopted this practice. In the first place, they recognize that nationally advertised materials are, in the majority of cases, materials of high quality, and this dealer cares to handle nothing but high quality materials. In the second place, nationally advertised materials are easy to sell; the general public knows about them; the contractors know about them; and customers will buy with less sales resistance when the lumber, millwork or shingles, as the case may be, bear a well known trade-mark. Thus, this dealer cashes in on the merchandising efforts of reliable manufacturers and profits from what they have done to remove sales resistance for their products.

The D. J. Peterson Lumber Company believe in the proper presentation of their materials. Their sheds are paved with concrete floors and are as dust-proof, as tightly built and neatly kept as lumber sheds can possibly be. This means that the materials when delivered to the job are clean and dry. That makes a good impression upon the customers and the contractors like to handle such materials.

Downtown sales office and display room. Contractors are allowed the use of this office for interviewing prospects

The D. J. Peterson Lumber Company keep all their materials in practically dustproof sheds. Note the concrete floor

But even in the finest piece of lumber or the best looking shingle there is very little that would make the average prospect want to build. That is why the D. J. Peterson Lumber Company do not stop with their fine office and well constructed lumber sheds. They have gone far beyond that. They have built for demonstration purposes a full-sized house, in the construction of which nothing but standard materials were used and materials representative of stock items which the dealers carry. (A picture of this house is shown on page 51 in the "Style Sheet" of this issue.) This house was widely advertised as "The Prettiest House in Town" and it was opened for public inspection when completed. Within six weeks it had been visited by over 10,000 people. The contractor who brings his customer to see this house can show the real homelike beauty of good lumber and flooring, and well designed millwork and other materials when in the finished home. With this house as an actual example and the many plan books of which it is representative, the contractor can take his customer "shopping for a home." This is the most effective kind of selling and makes many a prospect who is simply thinking of building actually get down to business.

But this model house was not enough. Mr. Peterson believes in practicing what he preaches and so he built a house for himself from the stock plan service which he offers his customers. His own home is even more elaborate than the one he built for demonstration purposes. It is located in one of the suburbs of Toledo, Ottawa Hills, and he also opened it for public inspection and advertised his home as "The Prettiest House in Ottawa Hills." A picture and plans of it are shown on page 50. The illustrations at the bottom of this page show views of the dining room and living room. The corner china closet, French doors, staircase, wainscoting and doors are all standard designs of woodwork which the company carries in stock.

With such facilities for clinching sales Mr. Peterson has naturally had to develop means of rounding up prospects so as to get them to the point where the contractor can cinch the business and get to work. Local real estate dealers furnish him with the names of building pros-

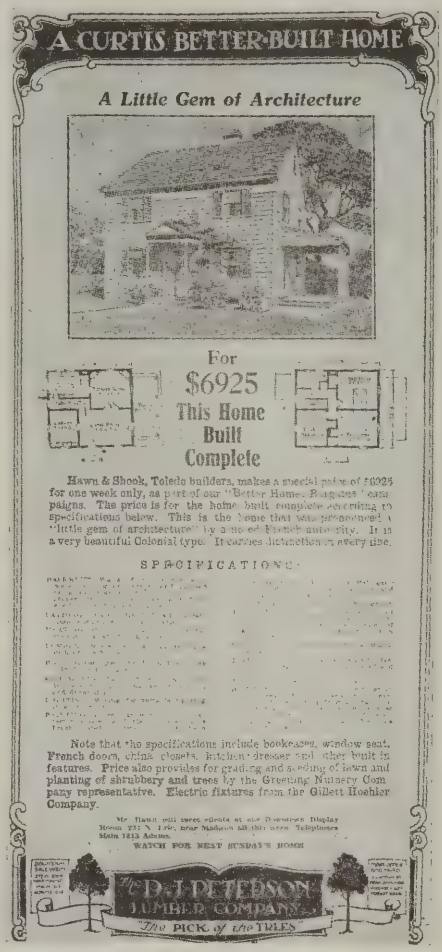
View of the dining room in Mr. J. H. Peterson's own home. The interior details and all materials are stock items

The living room in Mr. Peterson's home. A picture of the exterior and floor plans are shown on page 50

pects; contractors and architects send him names; he gets many from the advertising of the manufacturers whose material he handles; his own newspaper advertising, circular letters and sign boards get the company in touch with a great many prospective builders, and official records are searched for the names of owners of vacant lots and old buildings. The newspaper notices of building permits are filed and checked. The names of renters are recorded and real estate transfers fully noted. A complete and accurate mailing list always kept up-to-date keeps tab on these prospects and furnishes instantly full information about every name on the list, and these names run into the thousands. A series of follow-up letters is sent to each one in regular series.

If the prospect shows any genuine interest in home building his card goes in the index file with a blue tag. Blue tagged prospects receive special attention in the form of personal letters, telephone calls and solicitation from special salesmen until they get to the direct point of building, when the cards are red tagged. Red tagged prospects are then turned over to reliable contractors. The contractors get on the job, with the assistance of the lumber company's salesmen, and bend every effort to land the business. This is where the contractor has only to pull the trigger, and if he pulls it with a steady hand and a discerning eye he invariably brings down the game and profits from the work that the lumber company has done to an even greater degree than they themselves do.

But this is not all that the D. J. Peterson Lumber Company do for their contractors. As every builder knows, about the first thing that the average prospect asks about a house is "What will it cost?" If the lumber company advertised the prices of the materials only on the houses which they feature there would always be in back of the prospect's mind a fear of other charges not mentioned which would make the cost heavier. Consequently, a price on every house *complete*, including labor costs, is advertised. Furthermore, it is advertised over the contractor's name in addition to that of the D. J. Peterson Lumber Company. The advertisement is not a small one. It tells practically the whole story


A CURTIS BETTER-BUILT HOME

A Little Gem of Architecture

For $6925 This Home Built Complete

Hawn & Shook, Toledo builders, makes a special price of $6925 for one week only, as part of our "Better Homes Campaigns" campaigns. The price is for the home built complete according to specifications below. This is the home that was pronounced a "little gem of architecture" by a number of French authority. It is a very beautiful Colonial type. It carries distinction in every line.

SPECIFICATIONS

Note that the specifications include bookcases, window seat, French doors, china closets, kitchen dresser and other built in features. Price also provides for grading and seeding of lawn and planting of shrubbery and trees by the Greening Nursery Company representative. Electric fixtures from the Gillett Hoehler Company.

Mr. Hawn will meet clients at our Downtown Display Room, 237 N. Erie, near Madison all this week. Telephones Main 1813 Adams.

WATCH FOR NEXT SUNDAY'S HOME

The D. J. PETERSON LUMBER COMPANY The PICK of the TREES

Sample of a two-column newspaper advertisement run by the D. J. Peterson Lumber Company in the Toledo papers. Note the contractor's name and authority for the price quoted

and states that all material, labor, lighting, painting, plumbing, tile, interior finish and permanent furniture, the grading and leveling of the lawn, planting, shrubbery and trees, etc., are included, and states that the contractors who makes the quotations "will meet clients in our downtown display room, 237 North Erie, near Madison, all this week."

Every contractor-customer of the D. J. Peterson Lumber Company is given a week's advertising of this kind. There is no cost to him for this publicity. In addition, he is allowed the free use of the company's downtown sales office where he can interview prospects and carry on his business. This is an important service that the company offers their contractors, for few builders are possessors of suitable offices for the interviewing of prospective clients.

This merchandising campaign is one that appeals to the local architects as well as the contractors. No house costing over $15,000 is advertised, and when changes are desired in plans or special plans asked for, the client is advised to consult an architect. In that way, considerable business is directed to the architects which they might not get were the client left to his own resources.

The architects also approve the work of the D. J. Peterson Lumber Company because they advertise and advocate the building of nothing but homes of good design. Of course, the company will sell materials for any kind of house, but they frankly state to their customers that they would prefer to see only houses of good design built. This educational work naturally reacts in the interests of the architects, for it is gradually raising the standard of taste among prospective builders and making clients seek out architects who would have done without their services under other circumstances.

The D. J. Peterson Lumber Company in co-operating with their contractors, architects and builders in the manner described are indeed doing a pioneer work. Their program of co-operation suggests a solution of the problem that often arises as to where the province of the contractor ends and that of the dealer begins and *vice versa*.

The success of this program—and it has been remarkably successful though in operation for only a little over three years—is suggestive and is worth the consideration of lumber dealers and contractors everywhere.

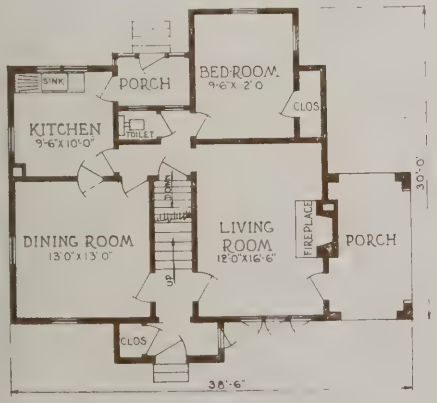
A few of the well-designed houses built from stock plans furnished by the D. J. Peterson Lumber Company

National Builder

STYLE SHEET

There's a Downstairs Bedroom in this Little Six Room Cottage in Knoxville, Tennessee

THIS house is one of the group in Knoxville, Tennessee, by Barber and McMurray, architects, which was described in the July NATIONAL BUILDER. It is worthy of presentation as a "Style Sheet" house because of its unusually good design and its skillfully planned interior. The downstairs bedroom is a feature desired by many families, particularly those on the farm. It is convenient in time of sickness or for the mother with an infant to care for. The downstairs toilet, with window to the rear porch, is accessible from all rooms on the first floor. The front entrance of this cottage, by being built out from the main wall of the house, not only produces an attractive architectural detail, but also provides a serviceable vestibule with coat closet.

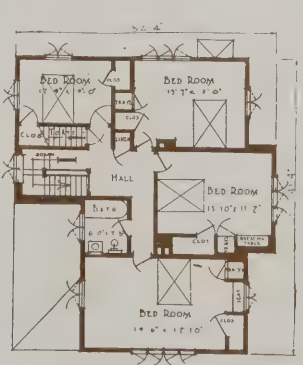


FIRST-FLOOR-PLAN

SECOND-FLOOR-PLAN

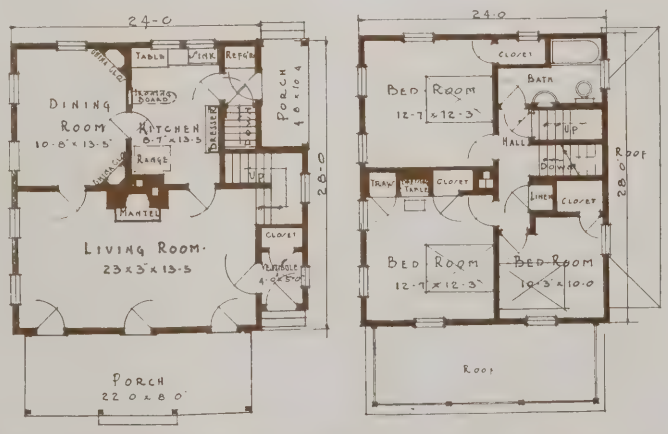
"The Prettiest House in Ottawa Hills," Ohio, Home of J. H. Peterson, of D. J. Peterson Lumber Company

OTTAWA HILLS is one of the suburbs of Toledo, Ohio. Here are located some of the finest residences in the city. To this charming new home of J. H. Peterson, of the D. J. Peterson Lumber Company of that city (see article on pages 46-48 of this issue), goes the distinction of being known as "The Prettiest House in Ottawa Hills." Like most of its neighbors, the house is a two-story English type, in stucco with wood shingled roof. Its dignified simplicity is relieved by the use of grouped casement windows. The driveway leads to a two-car garage, of similar architectural design. (See page 57.) There are eight main rooms in the house, and the third floor is used as a play-room. Besides the large screened porch, there is a paved terrace off the dining room on the other side. In line with its architecture, the interior woodwork downstairs is of oak, stained very dark. The only variation from this is in the handsome stair, which has balusters enameled in tan. Upstairs, and in the kitchen, enameled woodwork and edge grain yellow pine floors are used. The illustrations at the bottom of page 47 show two views of the interior of Mr. Peterson's home.



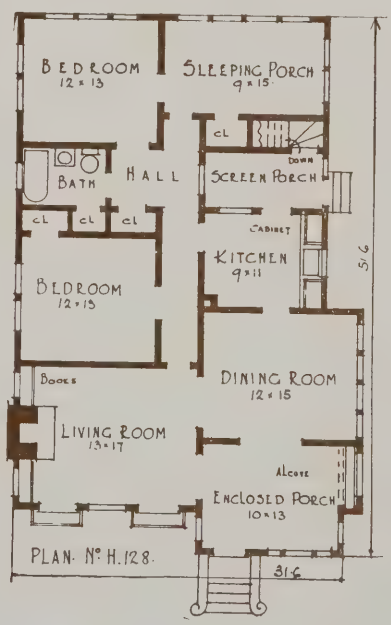
A Real Home Built by the D. J. Peterson Lumber Company for Demonstration Purposes

THIS interesting development of the "square" house for the narrow lot was built as a demonstration house by the D. J. Peterson Lumber Company of Toledo, Ohio, about whom there is an article on pages 46-48 of this issue. It is a six-room Colonial model, with attic space for additional rooms. The design is from the stock plan service used by the company, and was designed by Trowbridge & Ackerman, architects, of New York City. It is built entirely of materials from the dealer's yard stock—all nationally advertised products. The D. J. Peterson Lumber Company advertised it widely in full and half-pages in local newspapers as "The Prettiest House in Town," and many thousands of eager would-be homebuilders passed through it and registered during the "open house" days after its completion. Contractors and builders, as well as architects of the city, were invited for special days. Until the house was sold to Mr. H. E. MacKinnon of the Peterson company, it was a practical and highly successful display room for every kind of building materials sold by the company, showing exactly how each does its share in making a really satisfactory home.



A Bungalow with a Sleeping Porch and a Sun Parlor Which Serves Two Rooms

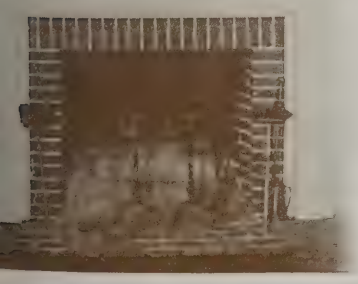
THIS house is particularly suited to a warm climate, but can be built anywhere.

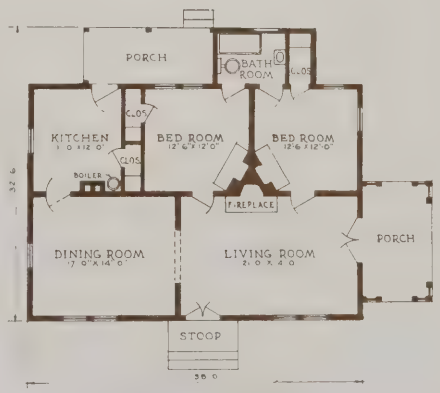


The louvres in the gable and the dormer permit ventilation of the attic space and so help to keep the main floor rooms cool on hot days. The overhanging roof protects the walls to a large extent from a hot sun and helps still further toward a cool interior. The house has an abundance of porches, all enclosed against winds and summer insect pests. The front porch opens directly upon both the living room and dining room and lends its space to both rooms. These rooms are so situated and connected as to make entertaining in this house easy and pleasureable. The sleeping quarters are a unit by themselves. Both bedrooms have unusual privacy and are convenient to the bathroom. The hall is lighted in the daytime through a window from the screened porch. Notice that the sleeping porch is accessible to the occupants of either chamber. Plans for this house can be purchased from the Southern Pine Association, New Orleans, Louisiana, by whose courtesy it is shown here.

This Stone Bungalow with Tile Roof is Heated by Three Fireplaces in One Chimney

LOCAL materials have been used in the construction of this bungalow. It is built of native stone in Murphreesboro, Tennessee. The Maugans-Bell Company were the builders. The stones are laid with pleasing effect and they add a dignity to the bungalow frequently associated with larger houses. This same design would, however, look well in any of the commoner exterior materials—siding, shingles, stucco or brick, and other roofings can be used successfully. One detail that is particularly pleasing is the divided light windows. The white muntins against the black background add interest to the openings. A noteworthy feature of the interior is seen in the three fireplaces. They are all served by a common chimney. This thoughtful planning saves cost in construction. These fireplaces furnish sufficient heat for the house in the South, and the family in the North who builds it will find them a source of great comfort on cold days in winter, and in those raw, chilly days in the spring after the furnace fire has been allowed to die out, or in fall before it is really time to start it up again.

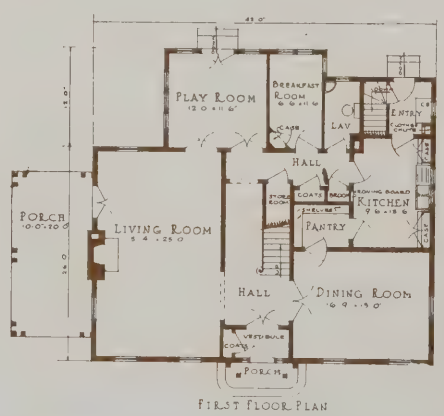




FIRST FLOOR PLAN

A Colonial House in Okmulgee, Oklahoma, with Two-Car Garage in the Same Style

A BIT of old New England, transplanted into Oklahoma, is seen in the home built for Ernest C. Lambert in Okmulgee, by E. J. Dean, builder. Carefully studied exterior details are characteristic of its Colonial models, such as slender columns and delicate moldings above the entrance and living porch, the dentil mold under the cornice, the six-paneled door with sidelights, and the symmetrically placed windows with their green blinds. The interior also follows precedent in its enameled woodwork of Colonial design, but the layout is an admirable example of modern planning. It is of the popular central hall type, with a vestibule and coat closet, and an imposing stair. In the rear are breakfast room, toilet, and play room opening toward the garden. Above this ell is the sleeping porch, open on three sides. The second story also includes owner's room, with fireplace, dressing room, bath with shower and three clothes closets, children's bedroom and guest room. Closet space is amply provided through the house for coats, linen, clothing, brooms. The two-car garage carries out the same architectural motifs. On one side a Colonial portico admits to a boxed stair leading to living quarters above. These consist of a combination living room, dining room, kitchen, bathroom and bedroom.



FIRST FLOOR PLAN

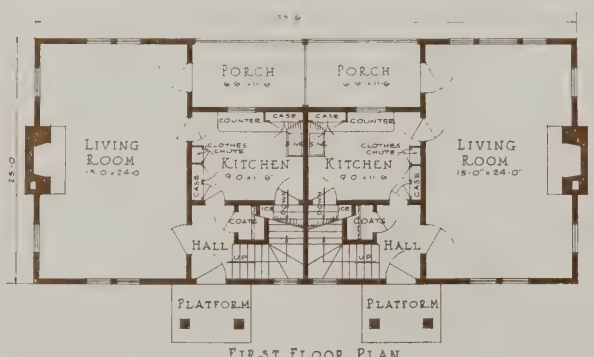
SECOND FLOOR PLAN

Four Bedrooms and Two Baths in this House. Judicious Use of a Lot that Slopes to the Rear

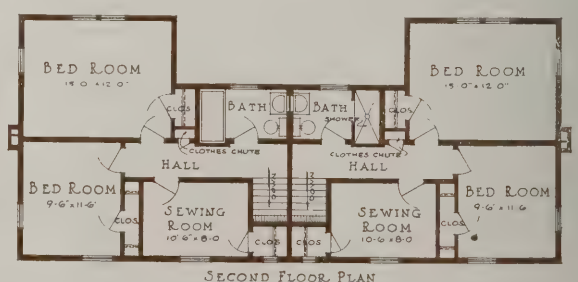
TO the many families who insist upon two bathrooms in the house with four bedrooms, this plan will be of interest. One bath is directly at the head of both the front and back stairways and is particularly convenient for the maid or a guest occupying the nearby chamber. Notice also the downstairs lavatory at the end of the hall under the stairway. This hall also provides a coat closet and telephone booth, as well as direct access to the rear of the house through a tiled entry. The service quarters are well arranged. The ice chest is inside the house, not against outside walls, yet the ice man need not cross the kitchen floor to fill it because of the convenient grade entry. This arrangement is made possible by the slope of the lot to the rear, which also provides usable space beneath the kitchen and screened porch. The design of this house is very good and its details are in keeping with its Colonial character. A course of headers above each window instead of the meaningless keystones would, however, have improved the appearance of the openings.

A "Double" House That Combines a Convenient Plan with a Good Design

THE Bowman-Newton Company, realtors and builders, Duluth, Minnesota, designed, planned and built this attractive two-family house for Mrs. E. H. Windom of the same city. It is a credit to both builders and owner and adds much to the appearance of the community of which it is a part. It shows how a two-family house can be made as pleasing in design as the individual residence while frankly admitting its "double" character, and the plan shows how a house of this type can save on construction costs. The two sections have a common wall, in which are located the soil stack and water pipes that serve both kitchens downstairs and both bathrooms upstairs. The plan on each floor is well worked out. The living rooms extend the entire depth of the house and have light and ventilation on three sides. These rooms could well afford to give up some space to dining rooms if they are desired. The fireplace could be placed across a corner between the living and dining rooms. A good sized porch within the main line of the house is in the rear, where each family can enjoy a view of the garden. Each bedroom has cross-corner light and ventilation.



FIRST FLOOR PLAN



SECOND FLOOR PLAN

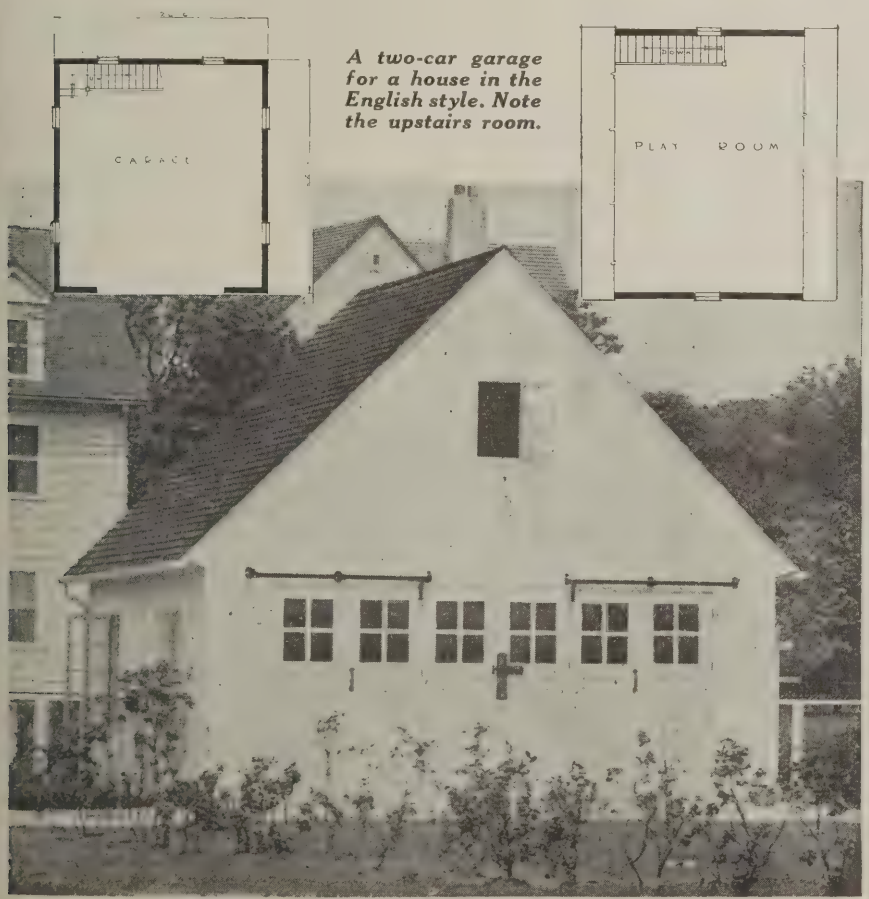
Two Garages That Are True-to-Type

In Colonial and English Styles

THE average garage, according to Bulletin No. 318, Bureau of Labor Statistics, costs about $500, or 13 per cent of the cost of the average one-family house. This fact, taken into consideration with the statement that there are more automobiles in use today than there are telephones, shows what a firmly intrenched institution the automobile is in modern life.

Since so much business comes from the building of garages, it behooves every builder to give them a good share of thought. One must admit too, that there has been a great improvement in the sort of garages built, just as there has been improvement in the sort of homes constructed. The man who builds or has a Colonial house, for instance, is very apt to mention when he engages a contractor to build his garage, that he wants it to follow the general lines of the house. If he doesn't, the builder should certainly suggest it to him, for two reasons: In the first place, it will be a greater community improvement, hence a greater satisfaction to the owner and a better advertisement for the builder; and in the second place, a real building rather than a shack is bound to mean a bigger job and a more profitable one.

A two-car garage of Colonial type



A two-car garage for a house in the English style. Note the upstairs room.

The attached garage, or motor room, must be taken care of by the architect—and a rather puzzling part of his work it is, at that, in most cases, since it is a strictly individual problem for each house. The separate or detached garage, however, can be built from stock plans to good advantage. Books of these plans should be in every builder's file. Most publishers of plan books also have garage books, and many lumber dealers supply them.

The illustrations here show two excellent types of private detached garages, which are well adapted to accompany the residences, with which they form a unit. The pitch of the roof, the materials, and the details, such as the cornices and the windows are in harmony with the main house. The steep roof of the garage provides ample room for a children's play room upstairs, which is well ventilated. This room can be used as servants' quarters, too, if desired.

The woodwork required for the garages—the doors, windows, frames, trim, etc., is all stock material.

The custom is becoming more and more general everywhere of building two-car garages, instead of accommodations for a single car. The other half can often be rented out by the family with but one car, or it enables them to provide accommodations for the cars of their friends or relatives who visit them.

Up-to-Date Mortuary With Living Quarters for Owner

Instead of a Sombre Undertaker's Establishment, McKay Brothers' Construction Company, in Cedar Rapids, Iowa, Designed and Built for Their Leading Local Mortician an Attractive Place of Business

ONE of the most attractive buildings in Cedar Rapids, Iowa, is what one would least expect it to be by its exterior appearance—a mortuary, or undertaker's establishment. The design and floor plan of this building are so unusual and so practical for many communities similar to the city in which it is located that NATIONAL BUILDER feels it deserves the attention of contractors, architects and builders everywhere.

This establishment is known as the Wymer Mortuary and was built during the latter half of 1922. It was designed, planned and constructed by the McKay Brothers' Construction Company, Cedar Rapids, under the personal supervision of Mr. Bruce McKay. "In the designing and planning of the building," says Mr. McKay, "we took a great deal of time and study to arrange everything not only for the present needs but for the future as well.

"The building is located in a residential district, so the exterior was designed to harmonize with the neighborhood. Dark Boone brick, Bedford stone trim, cream woodwork and dark red roof constitute the materials and color scheme of the exterior. The transomed casement windows on the first floor, the shutters on the second floor, the cornice and the central entrance with columns and wrought iron balcony all help to carry out the Colonial expression.

"From the front door you enter a large vestibule from which doors lead to the hall, auditorium and reception room. In this way, a person desiring to attend a funeral need not enter any other department.

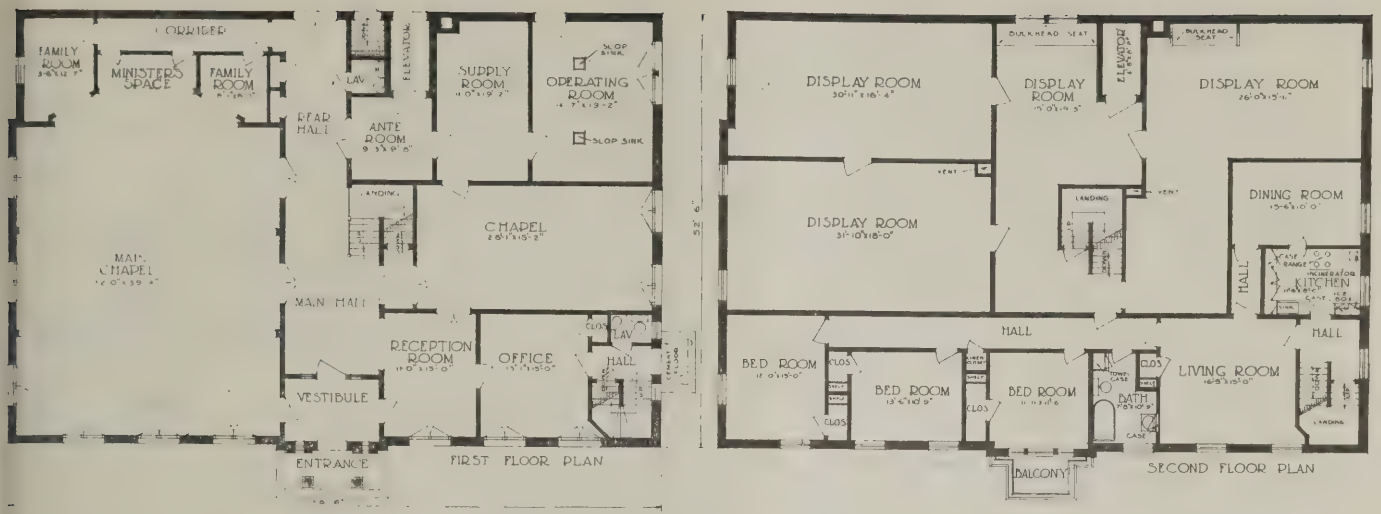
"The auditorium to the left of the vestibule will seat over 200 people and in case of a larger crowd, the French doors may be thrown open into the hall.

"The walls, woodwork and pews are gray so as to relieve the solemnity of the interior without making it too gay. The draperies at the window are corduroy cloth of cream and blue with fine white curtains over the window panes. The electric fixtures are of dull gold and bronze.

"The minister's space is recessed and arched. The two family rooms on each side lead directly to a loading platform in the rear which makes it possible for members of the deceased's family to be present but not seen during the funeral.

"A stair hall leads straight from the vestibule clear through the building to the garage, which will accommodate 30 cars. (This garage is not shown on the plans.) In this way, after the service, all of the people enter the cars under cover, not being

The Wymer Mortuary in Cedar Rapids, Iowa. Being in a residential district, the design was made to look as little like a commercial building or undertaker's establishment as possible. The central entrance with divided light windows, the white blinds and the small cornice, together with the pleasing proportions of the building, produce an attractive Colonial design



Floor plans of the Wymer Mortuary at Cedar Rapids, Iowa

exposed to the weather or public view.

"Three wide doors opening into the street make for rapid handling of the cars in a funeral procession as they can enter at one door, circle around, pause at the door opening from the reception hall and proceed out into the street. Or all the cars of one procession may be driven inside and all the passengers loaded at the same time and the cars then proceed out in order.

"To the right of the vestibule is the reception room, from which doors lead to the business office and smaller chapel. There are two chapels so that two services may be conducted at once if need be. In the case of private funerals, the smaller chapel is used.

"In the rear of the first floor are the operating, state rooms and elevator. People may come here to see bodies lying in state without intruding upon any other part of the building. The operating room is equipped with every modern convenience and is done in white tile throughout.

"Mr. Wymer and his family occupy the entire front of the second floor as their living quarters. Access to their home is gained by a private stairway on the extreme front right corner of the building. The rest of the second floor is used as display rooms for caskets, casket ornaments, clothing and decorations. A beautiful stairway leads to these rooms, which are also accessible by an elevator.

"Out of town patrons or members of the family who wish to remain close to the body of the deceased until after the services can be accommodated by bedrooms on the second floor.

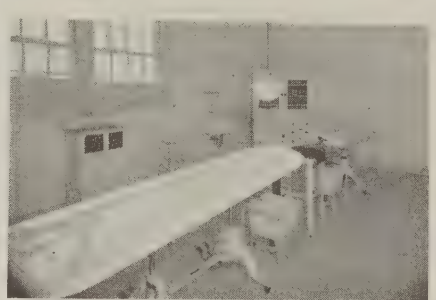
"On the third floor of the building are rooms for the employes of the establishment, including a radio room.

"In the basement are the display rooms for heavy steel and cement vaults, crematory space and boiler and coal rooms. The coal room extends under the garage floor and is loaded by direct dumping.

"Every modern convenience has been placed in this building, such as auxiliary oil heater for boiler, gas tanks and air pumps in garage, cistern, etc.

"In the construction we have had great success in the use of deadening felt. It is most important in a building of this kind to have quietness and we have succeeded to the fullest extent in obtaining it by the use of this felt.

In this office business details can be discussed outside of earshot of other patrons or guests



The operating or preparation room. Four bodies may be cared for at one time in this room

The spacious main hall. The woodwork is in silver gray, and the walls are done in the same tonal simplicity that is a happy medium between dullness and a color that would be out of place in such a room

The main chapel, looking toward the minister's space, showing the curtained doorways on the sides which lead into private rooms for the family who desire to be present but not seen at the funeral

Front view of the barn showing the two concrete silos and the ramp leading to the mow floor. Note the wire-covered opening left at the top of each silo

A Southern Dairy Barn

THE barn described in this article is located on the Cherokee Farm of the University of Tennessee. Due to the mild climate encountered in the South the design of this barn is slightly different from the type of building used in the great dairying districts of the Middle West, the chief difference being in the wall construction.

Farmers in the Middle West who are faced with the problem of providing tight and well insulated walls to keep their stock comfortable in severe weather will undoubtedly find something here which they consider unusual in wall construction. In the illustration showing the feed stalls and the cattle yard a wall opening about two feet high may be noticed. This is left uncovered the year 'round as the climate where this barn is located is so mild that it never becomes cold enough to warrant building a tight barn. The problem here is how to keep the cattle comfortable in the summer time rather than how to keep them warm in winter.

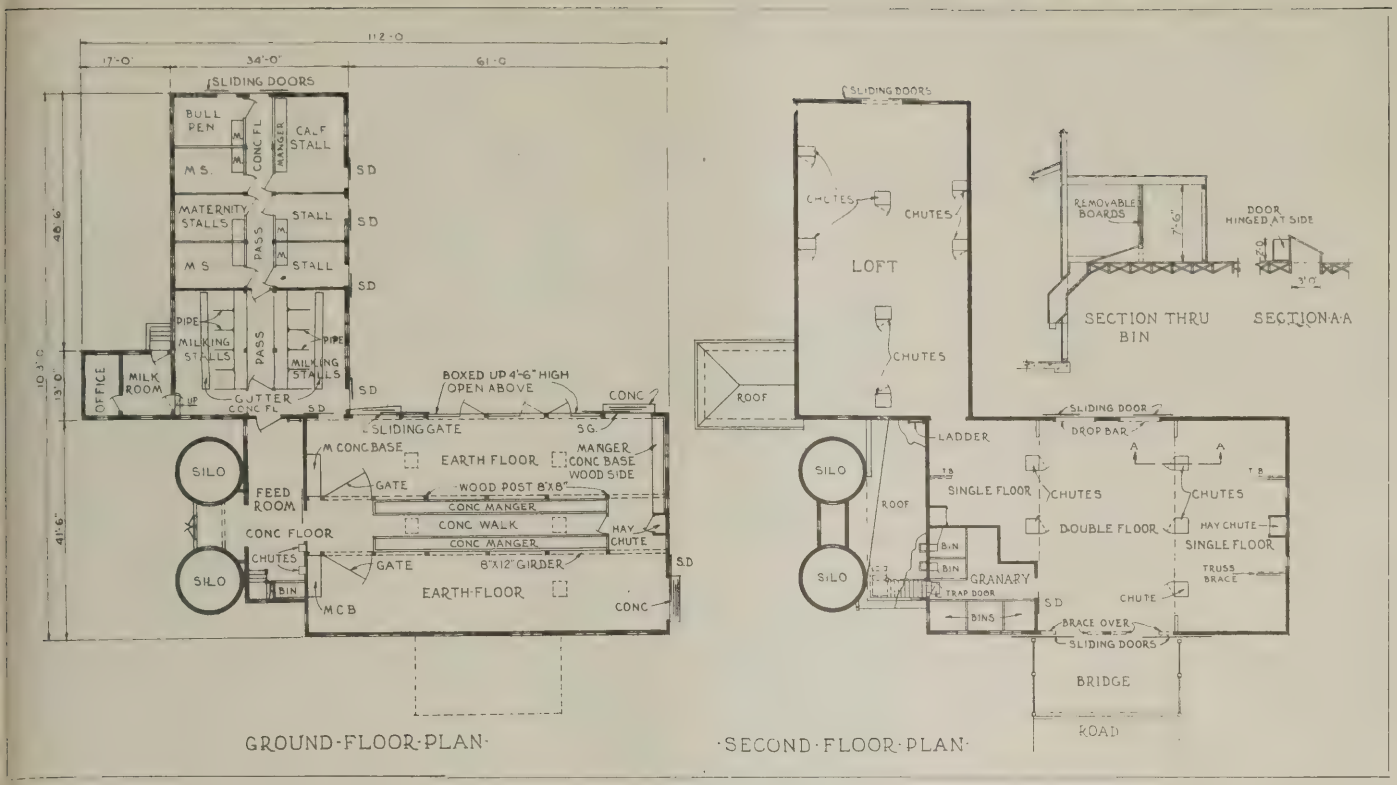
An interesting feature of this barn is the gates which are used to block the cattle runs. They are arranged in a fashion similar to those used in the storage pens of slaughtering-house stockyards. A study of the ground floor plan will show that the same gate may be used to open or block a passage. For instance if it were desired to transfer cattle from one side of the main wing to the other through the passage adjacent to the feed room, one gate would be swung inward, opening one side of the main wing, and the opposite gate would be swung outward, opening the other side and at the same time blocking the entrance to the feed room, thus allowing only one way for the cattle to pass and preventing confusion.

Ventilation for the silos is provided by leaving a space about two feet high between the top of the silo wall and the eaves. The roof is supported on wood studs and to prevent birds from entering the silo, the opening is covered with coarse-mesh wire. Thus a saving of two feet of concrete is effected.

The facilities for feed distribution are also worthy of notice. Small grains are

Feed stalls and alley. This alley serves two sets of stalls

Cattle yard in rear of barn. Note the ventilation opening in the wall of the main wing



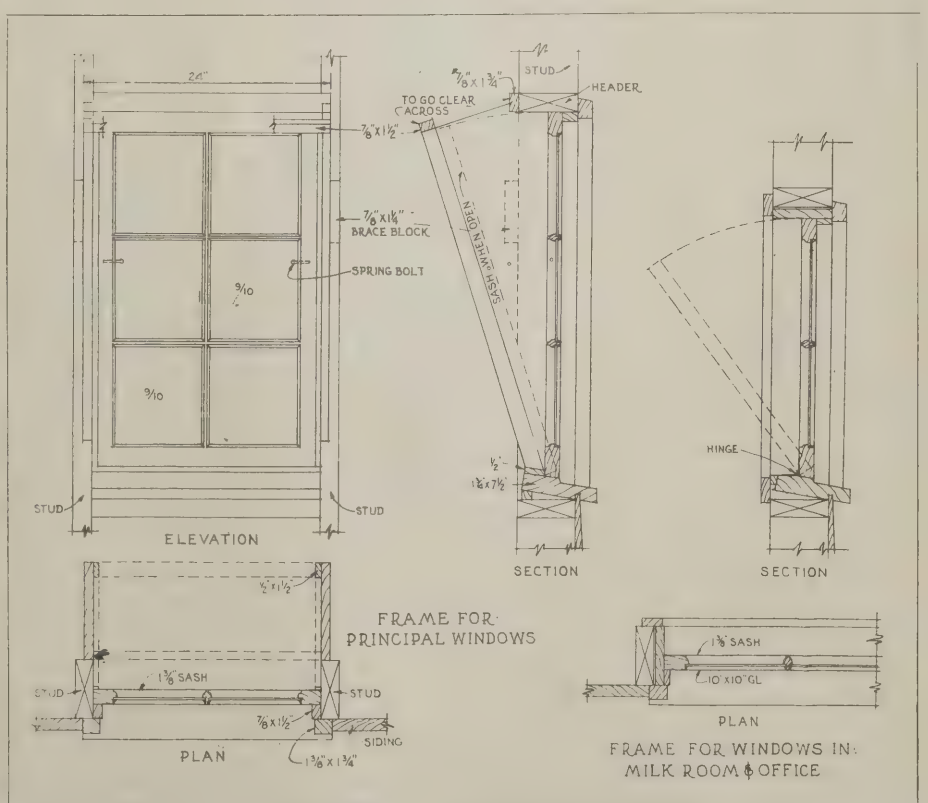
Notice on the first floor plan that the gates may be swung to free one opening and block another. This is an interesting feature of the design

stored in bins on the mow floor directly over the feed room and are delivered to the feed room by means of chutes. Silage is drawn directly from the silos which open into the feed room. Delivery chutes for hay are located at several points on the mow floor and open into mangers below. This makes for a saving of labor in distributing fodder since it will have to be carried only for short distances. The window construction details are also interesting.

C. A. Willson, dean of the Department of Agriculture of the University of Tennessee was associated with John H. Ryno, a Knoxville, Tennessee, architect, in this design.

Interior of feed room. The man with the sack is drawing feed from an overhead bin

Milking stalls. Maternity stalls are shown in the far end of the picture



A few details of the window construction

An Unusual Bank Building

On an Irregular Lot

THE regular dimensioned rectangular lot presents few difficulties to the architect who is to design a building for it but when the lot under consideration is irregular the problem sometimes becomes quite complicated. It is in designing buildings for irregular lots that the architect is called upon to use his ingenuity and to test his ability to fit a building to the site.

The building shown here is the Lee Circle branch of the Canal Commercial Trust and Savings Bank of New Orleans, Louisiana, and it stands as a good example of making the most of a hard problem of planning. The sides are all of different lengths, the longest being only 57 feet, 3½ inches long. The two street frontages are 23 feet, 7¼ inches long and 36 feet, 5¾ inches long.

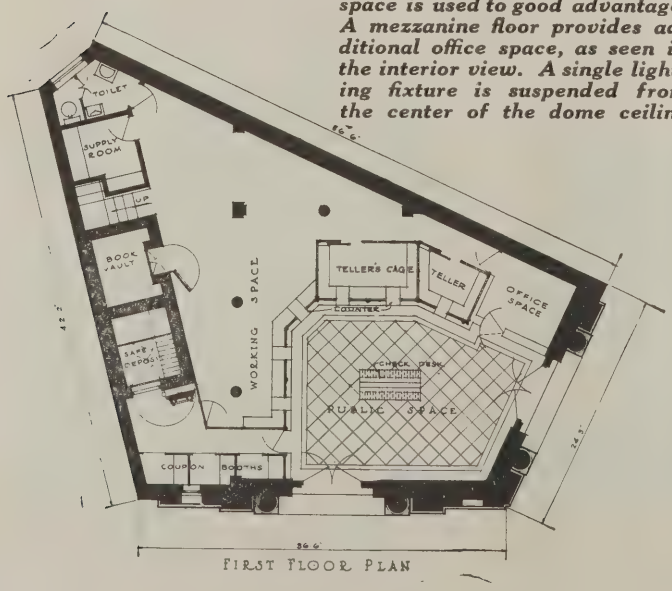
Cut limestone was used for the exterior. The two entrance doorways are built of metal and high transoms are used to permit the entrance of sufficient sunlight to illuminate the interior. Two large bronze ornaments are used where the wall space permits, and on both entrance ways, a lighting fixture is placed beside the columns which support the stonework above the doorways. The roof is covered with sheet copper arranged in ornamental panels.

The interior is equally interesting. The tellers' cages, officers' space, vaults, supply closets, bookkeepers' working space, public space, and toilet are located on the ground floor but a mezzanine floor has been provided to afford additional space. Wide arches give the appearance of supporting the ceiling over the mezzanine and metal railings are placed around the edge of the mezzanine floor. Ornamental plaster is used for the walls and ceilings, and a single lighting fixture is suspended from the center of the dome.

The ground floor, the writing stand, and the lower part of the tellers' cages are made of composition material, with a dark base for the writing stand and the cages. The cage railings are bronze.

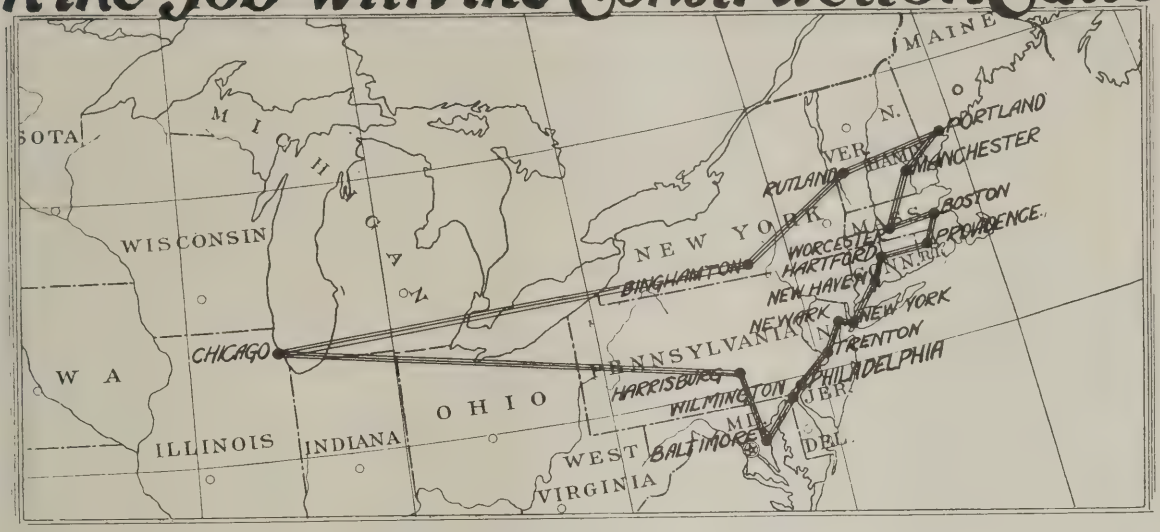
Favrot and Livaudais of New Orleans, were the architects.

Lee Circle branch of the Canal Commercial Trust and Savings Bank, New Orleans. It is built on an irregular corner lot. Compare the two similar but different fronts. Favrot and Livaudais were the architects



Floor plan and interior view. No two sides of the building are of the same size, yet the floor space is used to good advantage. A mezzanine floor provides additional office space, as seen in the interior view. A single lighting fixture is suspended from the center of the dome ceiling

On the Job with the Construction Editor



ON July 2, Roy M. Singer, Construction Editor of NATIONAL BUILDER, again left his desk and library and went out to visit the contractor and builder *on the job,* to see what they were doing and how they did it, which is not always told in books and magazines and papers. He journeyed East this time, visiting builders in eleven states, stopping at sixteen cities, not to mention many smaller points near them, and he covered 2768 miles, returning to the office on August 10. In those five and one-half weeks he talked with scores of contractors and builders, saw their jobs, photographed interesting points about them to pass on to you, and got such a view of the builder's problems as only a traveling editor can. Some of the results of Singer's observations are contained in the following pages. More will appear in future issues and in the meantime he is out after more good stuff from other sections for the readers of NATIONAL BUILDER. He is a regular "off again, on again, gone again" fellow. You may see him some day climbing over your lumber piles, with camera and note book in hand, or shinning up your ladders to see what you are doing that other builders would like to know about.

On the Job in South Portland, Maine. This photograph shows Roy M. Singer (center), Construction Editor of National Builder, with Chas. Brewer (left), concrete worker, and A. A. Turner (right), a contractor who has done considerable work in South Portland, Maine

NATIONAL BUILDER'S advice to you is that you file this issue and all others with these "On the Job" pages, for future reference, because nowhere else will you find the hints to builders and examples of time-, money-, and labor-saving ideas that are contained in these pages. No books have them and NATIONAL BUILDER is the only journal published for the contractor, architect and builder, that publishes practical help of this kind—help that will be of value to you in your business.

On the Job in Maine

To Hold a Sidewalk Incline

WHERE material delivery is made at the site instead of at the curb an incline is necessary to bring the trucks over the curb to the sidewalk. The one

Note pin in pavement to prevent slipping of incline

shown here was used on a job in Portland, Maine, by N. E. Redlon, a general contractor of that city. It is built of three 8x10's, spiked to a wedge-shaped piece of plank which rests on the pavement. The wedge-shaped pieces of plank are spaced about three feet on centers in order to make the incline solid and to prevent the deflection of the surface planks when a load goes over them. In order that the truck wheels passing over the incline may not be blocked by the two-inch thickness of plank when the truck starts over the incline, the edge is beveled. This bevel also serves the purpose of prolonging the life of the first plank in the incline since a plank with a vertical edge would soon be crushed by the heavy loads starting over it.

Notice that a spike has been driven into the pavement at the edge of the first plank. This spike will prevent the incline from slipping forward and leaving a space between the upper edge and the curb as an unfastened incline is certain to crawl. If the pavement is asphalt this method can be readily used with but slight damage to the road surface. Note also that a barricade is provided to prevent trucks from running over the ends of the incline.

Supporting Old Roof Trusses During Alterations

IN Portland, Maine, Di Biase, Chessi & Company secured a job which invoked the remodeling of an old church building. In the course of the work it became necessary to cut the forward roof truss and some method of support had to be devised to carry the roof load at this time. Instead of wrecking the old truss it was decided to support it in place temporarily and when the steel work was set, furnish a permanent column.

These trusses were supported on 12x12 columns which ran up from the basement floor

Heavy timbers were used and were run up from the level of the basement floor thus supporting the truss from below and leaving the workmen free to wreck the intermediate floors without fear of causing the collapse of the entire building. Notice also that where a portion of the ridge has been cut away, collar beams are used to hold the roof.

Level Mark for Top of Foundation

IN the illustration shown here is pictured the way A. A. Turner, a builder of South Portland, Maine, marks his foundation forms to indicate the level to which the concrete should be poured.

Marks are first placed at the foundation corners at the height of the top of the foundation with the aid of a level. A chalked line is then stretched between two marks and snapped, leaving the white line shown on the inside of the form. As this line would soon be invisible when poring commenced, nails, about four feet apart are driven into the forms at the line as shown in the illustration. These nails make a permanent mark to indicate the height to which the form should be filled and they may be spaced close enough together to insure the top of the foundation being at the same level all the way around.

By the use of this method of marking forms it may be possible to save quite a bit of time since it is necessary to use the builder's level only at the corners. This means less fussing with the level rod in setting the form marks.

Nails placed on the inside of concrete formwork to indicate top of foundation. Note the mark made by a chalk-line to locate the level at which the nails are to be driven

On the Job in New Haven, Conn.

Tall Scaffolding Details

FOR the contractor who is interested in building a scaffold such as is shown here, a study of the accompanying illustrations should show how a tall scaffold is built. The base is built on heavy timber columns and with heavy joists so that the top of the base which forms the roof over the sidewalk may be used as storage space for materials. The scaffold is built up from this base as shown in Fig. 1, and is held to the building by diagonal braces as shown in Fig. 2. Note that the entire scaffold system (Fig. 1) is a series of squares, braced diagonally for stiffness.

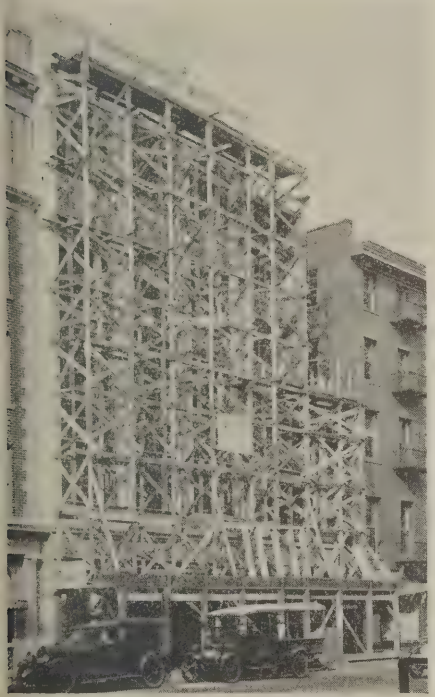


Fig. 1—Front of building showing scaffold assembly

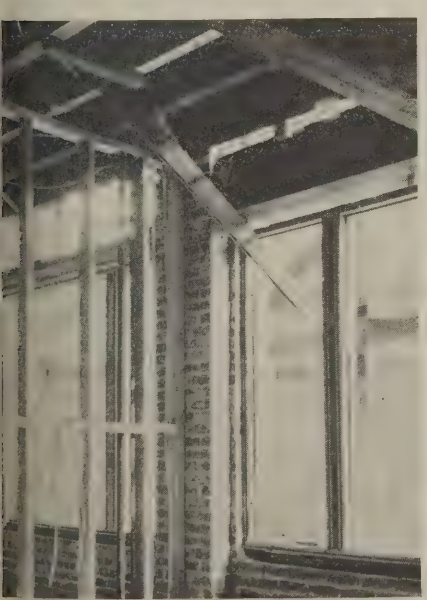


Fig. 2—Method of holding scaffold to building

Pipe set in tall, narrow piles by the use of short pieces of strap iron bent at the ends. Note a few of the pieces lying in front of the pile in the foreground

For the contractor who is working in narrow quarters the storage space provided by the lower part of the scaffold is nothing short of a life saver.

A Way to Pile Pipe in a Small Space

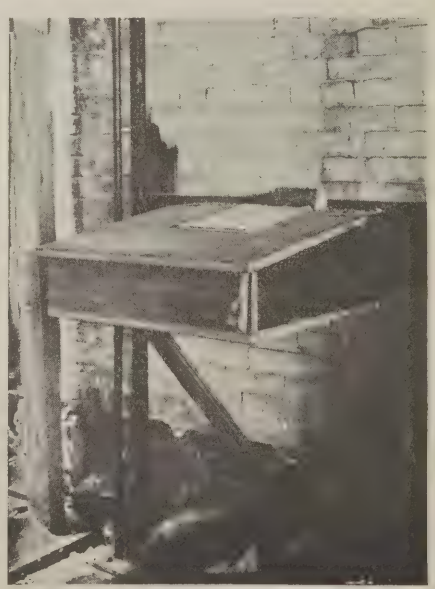
TO the contractor who finds it necessary to pile pipe or reinforcing bars in a small space this kink used by the C. S. Mersick Company of New Haven, Connecticut, should prove helpful. A piece of strap iron, one-quarter inch thick and about two inches wide is bent at the ends. These irons are placed in the pile as shown in the illustration. The vertical ends keep the bundles of pipe from rolling and serve to make the whole pile solid. They are inexpensive and indestructable and by their use pipe or reinforcing bars may be piled to considerable heights in a small space instead of piling them between stakes or in racks as is usually done.

An Inexpensive Superintendent's Desk

ON every job it is necessary to have some place where the superintendent can do his writing and planning and on small jobs, where the size does not warrant the erection of an office shanty, the National Construction Company of New Haven, Connecticut, sets a desk in some convenient spot in the building.

Note that the desk shown here is not a costly mahogany affair such as one finds in offices but simply a rough, on-the-job piece of furniture thrown together from a few short pieces of boards. The top is hinged and it may be lifted to gain entrance to the storage space. The desk is supported from below by a brace and is nailed to a cleat which is fastened to the wall.

The cost of such a desk is very small indeed and it may be easily moved from one job to another.



Superintendent's desk made of scrap lumber

On the Job in Wilmington, Del.

A Concrete Storage Hopper

ILLUSTRATED here is a concrete storage hopper used by John E. Healy & Sons, of Wilmington, Delaware, on the construction of a small reinforced concrete hospital. Concrete was carried to the forms by means of chutes, but in some places it was found to be inconvenient to pour directly from the chutes into the forms and buggies had to be used. In order to receive the concrete from the chute, the hopper shown here was built.

It is mounted on 4x4 legs which run

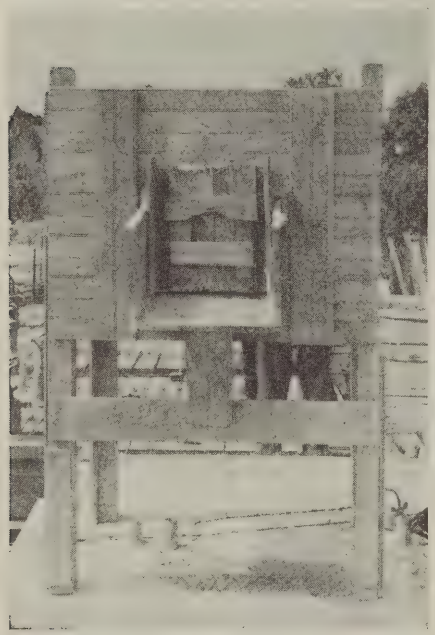


Fig. 1—Front view of hopper showing door and delivery chute

up through the hopper on the outside and furnish a place upon which the boards which form the sides can be nailed. As shown in Fig. 2, the bottom is built sloping toward the outlet so that the concrete will more readily pour into the buggies. Note that the corners in the front of the hopper are blocked with boards. This is to prevent the concrete from jamming in the corners and clogging the outlet.

The concrete is delivered to the buggies through a small chute, supported from the leg-brace as shown in Fig. 1. Note also in Fig. 1 the hopper door and the manner in which it is built and held to the box. It slides upward and can be jammed down in the position shown in Fig. 1 when it is desired to cut off the flow of concrete.

This whole device is simply and easily built. It is small and portable and a good thing for the man whose job does not

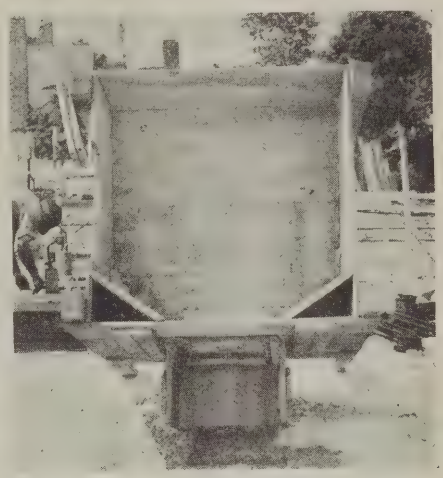


Fig. 2—Top view of hopper showing sloping floor and blocked front corners

warrant the purchase of a regular steel hopper. Such a hopper as this should last through an ordinary sized job.

An Aid to the Carpenter

THIS illustration shows a device which should prove useful to the carpenter who is hanging moldings, and the idea belongs to S. Tobasso, a contractor of

Step fixed on end of carpenter's horse to be used when hanging moldings

Wilmington, Delaware. It is nothing more than a step, arranged on one end of a carpenter's horse so that it can be used to stand upon. Thus the carpenter has a step and a horse combined and does not need a ladder.

Note that a piece of one-inch board is hung over the end of the horse so that it touches the floor and prevents the horse from tipping.

Dash Spattering Apparatus

LOWE BROTHERS, plastering and stucco-work contractors of Wilmington, Delaware, use simple and very inexpensive equipment for spattering dash aggregate on stucco walls. The aggregate is carried in a screen and thrown on the wall by means of the wooden paddle shown in the illustration. The screen is made of heavy wire so that it does not

Screen and paddle used for spattering dash aggregate on stucco walls

soon wear out. By the use of the screen, the contractor may be assured that little dust gets on the wall, as it all falls through the screen when the aggregate is scooped up. Dust, by the way, may cause a spotted and discolored wall and all aggregate should be washed before it is thrown on.

The paddle is a simple affair and is cut from a shingle. A few strips are nailed at the edge as shown to prevent the aggregate from slipping off as it is about to be thrown on the wall. The screen may be bought from a local dealer or it may be made on the job.

On the Job in Rhode Island

An Eastern Builder's Putlock

HERE is a putlock that seems to be used quite generally by New England contractors, and the writer's attention was

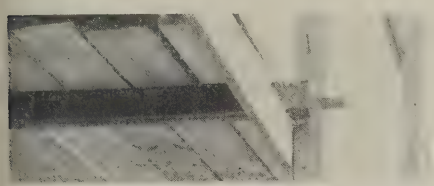


Fig. 1—Detail of putlock hook and iron collar

called to it while visiting a job of the Enterprise Building Company at Woonsocket, Rhode Island.

A saw-cut, just wide and deep enough to provide for the entrance of a piece of strap-iron, is made longitudinally on what

Fig. 2—Scaffolding assembled

is to be the under side of the putlock for its entire length. The piece of strap-iron, about two inches wide, is cut on one end as shown in Fig. 1, and projects over the end of the putlock just far enough so that the hook will fit over the width of a brick.

When using the ordinary putlock it is necessary to patch the wall after the putlock is removed, but by the use of the type shown here, such patching is not necessary. The hook is just wide enough to fit a brick joint and all that is required after it is removed is to fill the joint with mortar since the end of the putlock stops at the wall and only the strap-iron hook runs through.

The scaffolding shown in Fig. 2 is also worthy of notice. The uprights are 4x4 and to provide a good base, they rest on a short piece of waste plank. At about the level of the basement windows they are stiffened by means of the ledger board for the first tier of scaffolding. At the working level the putlocks are carried on a 2x8 ledger board which is nailed to the posts and supported on the under side by a cleat as shown.

To Prevent Drip Stains on Shingle Walls

WHERE walls are shingled the down-spouts should be set at the same time the gutters are placed, or a mark where water has run down the wall from the gutter opening, may result. If the shingles are to be painted or stained a dark color, this water discoloration will be covered, but where the shingles are to be left in natural finish it will take considerable time before weathering will cover up the mark.

It sometimes happens, however, that it is not possible to place the gutters and down-spouts at the same time. If the gutters are hung and the down-spouts not placed some means should be provided to divert the rain-water from the wall. In the accompanying illustration is shown a simple way of keeping the water away from the wall as it pours from the gutter opening. Two shin-

Shingle placed to divert water from wall

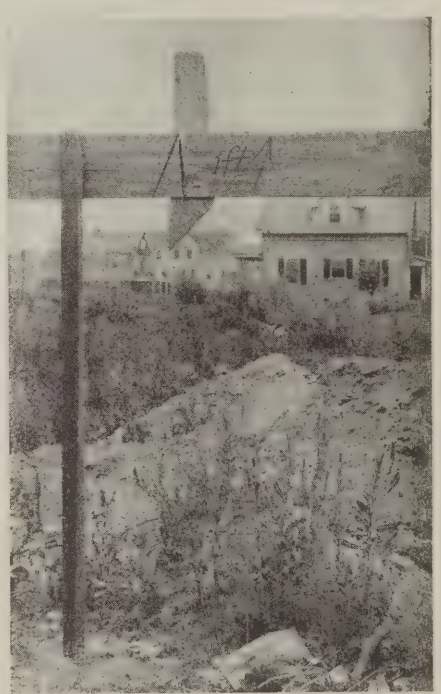
gles, tacked as shown, do the work. This idea is, of course, only an emergency method, but it will serve the purpose for the few days it may be required.

Luigi Zabbo and Brother of Providence, Rhode Island, were the builders of the home shown in this photograph.

A Permanently Marked Batter-Board

FEW things are more important on a job than batter-boards. If a batter-board is incorrectly set or the marks inconspicuously placed, the foundation corners will be improperly located and when the building is started it will be found that some things do not fit.

The photograph shown here was taken



Notice notch at arrow-point

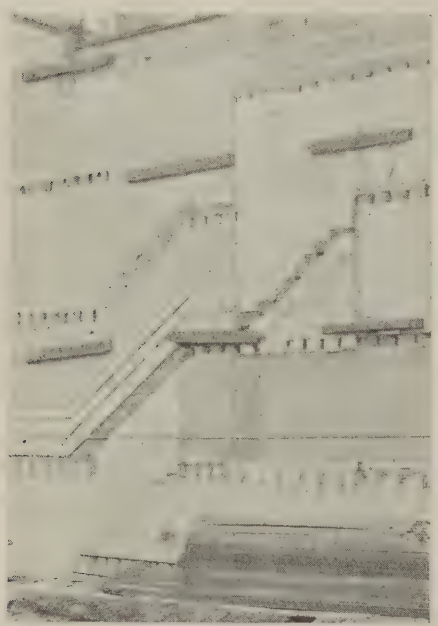
on a job being done in Providence, Rhode Island, by Harry Fisher. The ground was considerably below the street grade and therefore a high batter-board was required. Posts were driven and horizontal boards nailed to them. The corner was marked by a notch so that it would be permanent, and as the top of the foundation was to come a foot above the top of the posts, this information was marked on the board. Support for the chalk-line was furnished by a nail set in a short stick at the proper level.

On the Job in New Jersey

A Safeguard for the Excavator

UNDERPINNING is common practice today and excavations are carried far below the foundations of buildings adjacent to the excavation, but where the building next to the excavation happens to be very old and the walls are in an uncertain condition, no effort should be spared to brace the building as solidly as possible in addition to underpinning the foundations.

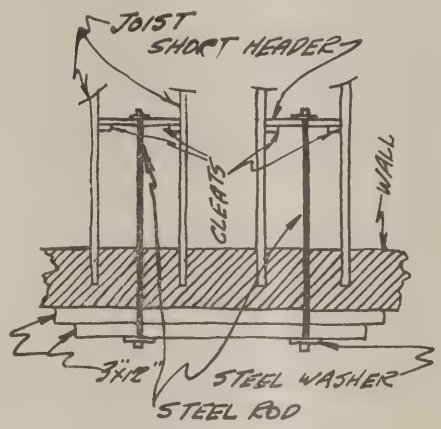
In the illustration shown here, the Karno-Smith Company of Trenton, New Jersey, were up against the problem of carrying an excavation to a considerable depth below the foundations of an adjacent old building.



Wall held by steel rods fastened to headers between joists

About four feet back from the inside of the wall cleats were nailed to some of the joists, and short headers were nailed to the cleats. The headers were bored for one inch steel rods which ran from the headers through holes drilled in the wall to the outside. On the outside two 3x12s were set against the wall and the rods run through them as shown. Steel washers and nuts were set on each end of the rods and when the nuts were tightened, the whole arrangement served to provide a firm anchorage for the wall. In order for the wall to overturn it would have been necessary for the entire building to collapse.

Notice in the illustration that long



Sketch showing details of rods and headers

pieces of 3x12s were used to bear against the wall. This assured a firmer distribution of the load than if short pieces had been used.

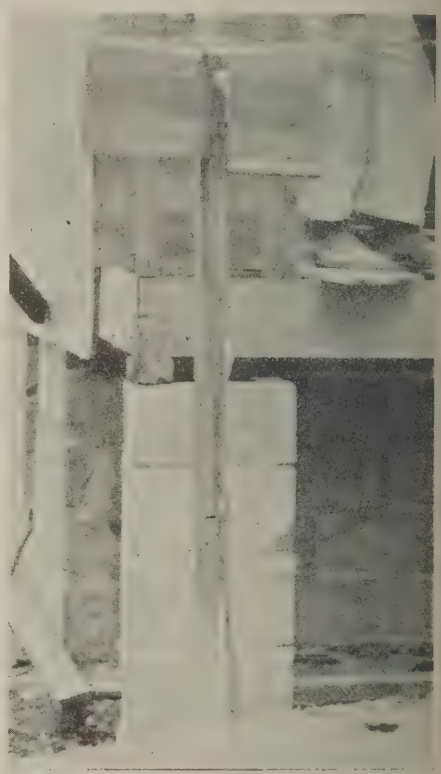
Extending Sheathing to Provide for Scaffold

JOSEPH KAST, of Newark, New Jersey, is a builder who believes in using as many labor saving methods as possible and here is one of his ideas. Instead of building a scaffold with posts and braces for his carpenters to work upon he merely extends every tenth piece of sheathing, lays planks across and has a solid scaffold without going to the trouble of building it up from the ground. When the scaffold has served its purpose the planks are removed and the projecting pieces of sheathing sawed off.

Sidewall sheathing extended to provide scaffold base

A Home-Made Hod

THE hod shown here was made by a laborer in the employ of Frederick New, a builder of East Orange, New Jersey. The handle is made from a stout branch, split at the end to receive the box. A short piece of 1x2 is nailed on the under side of the box so that the sharp edge will not bear on the carrier's shoulder.



Note handles at end of hod box

An interesting feature of this hod is the two handles projecting from the open end of the box. These handles provide a place for a grip on the box and are a help to the carrier in lifting the hod to his shoulder and in dumping the load.

On the Job in Harrisburg, Pa.

Furring for Rubble Walls

A BUILDING with solid stone walls presents some very interesting details not the least of which is the way the walls are furred. A stone wall is very rough and therefore ordinary 1x2 furring is out of the question because it would hardly be heavy enough to carry the lath over the rough places and besides it would be exceedingly difficult to fasten to the stone wall.

M. G. Sollenberger, a contractor of Harrisburg, Pennsylvania, sets furring in stone buildings as shown in the accompanying illustration. Note that all furring strips are 2x4s and that they are set independent of

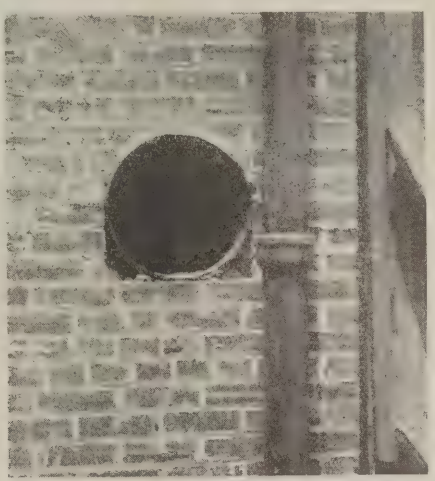
Note provision made for steam pipes

the wall. They actually form a system of interior framing. They are necessary, however, if a good lathing base is desired. Note especially how provision is made for piping.

Wrought Iron Thimble

THIMBLES to permit the passage of pipes and flues through brick walls are generally made of galvanized iron or light sheet metal and the corbel effect of the brick work is usually calculated to span the opening.

Not so in this instance, however, which was installed by J. A. McKelvey, a Harrisburg, Pennsylvania, contractor. The building was an exceptionally fine residence, and as the opening was for a 12-inch flue, a wrought iron ring one-quarter inch thick and one and one-half inch wide was made in a local blacksmith shop. The ring is held to the wall by four quarter-inch bolts which extend into the masonry. This ring is suffi-



Wrought iron thimble in place

ciently strong to act as a lintel over the opening and it may be depended upon to maintain its shape, thus assuring an easy fit when the time comes to set the smoke pipe.

Framing a Large Dormer

HERE is the way a Harrisburg, Pennsylvania, builder frames a large dormer. Note that the studs supporting the dormer eaves do not rest on the rafter, but run by and are set on a sill which is directly over a partition. There are several other ways of framing this particular job, but the method shown here is illustrated in the hope that it may offer a suggestion or provoke discussion of some of the other methods.

These studs rest on a plate directly over a bearing partition

A Laborer's Ladder

WHERE hoists are not used on a job all materials must be transferred from story to story by hod carriers. Most con-

Note that the ladder is extended high above the opening in order to provide a good hand hold

tractors use a slanting ladder, but this kind of ladder has a serious drawback in that the hod carrier coming down is quite apt to bump the bottom of his hod handle against the ladder cleat, and in a short time the ladder must be repaired.

H. T. Bayless, of Harrisburg, Pennsylvania, recommends a vertical ladder.

The ladder is fixed in place as shown in the illustration. A strip is nailed to each leg of the ladder and also to three joists. This gives a firm and solid support. At the base, the leg is toe-nailed to the rough floor.

A house of "Victorian" style in Centerville, Iowa, recently remodeled, as shown in the photographs on the right

Bringing an Old House Up to Date

HARRY JENNINGS, in Centerville, Iowa, owned an old house built several decades ago and now classed with what is commonly referred to as the "Victorian" period. Being built when that type of house was the style, the nineteen twenties pronounced it out of date. Its fancy millwork on the porch and the spindling turned porch posts plainly gave its age away. Every town over ten years old has any number of old houses like this one. What can be done with them is the question. The materials used in their construction and the workmanship are usually even better than in many houses built today, so it is desirable to utilize the shells of the old houses so far as possible and remodel them, bringing them up to date.

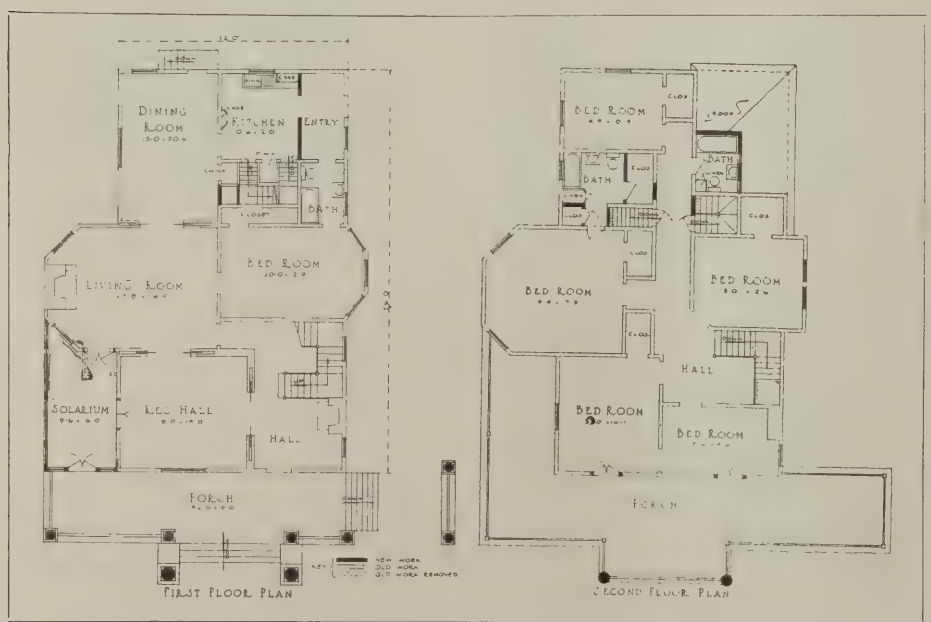
Mr. Jennings called in his local general contractor and architect, V. A. Banta, for ideas and assistance. The result of their conference and Mr. Banta's work is seen in the accompanying illustrations and plans.

Home of Mr. Harry Jennings, Centerville, Iowa, after remodeling by V. A. Banta, general contractor and architect. See floor plans at bottom of page

Another view of the double-deck large front porch, showing the porte-cochere

One wing of the porch was converted into a solarium accessible from both living room and reception hall

The useless and unornamental gable in the front of the house, with its Palladian window, was eliminated entirely and the main roof brought down, as it should have been in the first place. Instead of the narrow little porch of the old house, a big broad two-story porch was added, with the part over the entrance extending out from the house and terminating in a pediment supported by two long fluted columns with Corinthian capitals, after the manner of Colonial houses with two-story porches so often seen in the South. One end of the porch was extended to form a porte-cochere for convenience in the use of the auto. Another wing of the porch was enclosed and converted into a solarium or sun room, with direct access provided to both the living room and reception hall. A study of the floor plans will show other changes, such as the dividing up of the big old-fashioned kitchen into a smaller kitchen and a service entry. The new work on the plans is indicated by heavy solid lines, old work by thin parallel lines, and old work removed by parallel dotted lines. Inside, all new floors were installed. Upstairs they are of clear red oak. Quarry tile in 6x9 units were used in the solarium and white tile floors and walls were used in the bathrooms, of which one is a new addition to the house. The entire inside of the house was redecorated with interior trim white enameled. The outside was painted white with a warm Colonial red roof.



Floor plans before and after remodeling the house illustrated above, showing new work, old work, and old work removed

Suggestions for the Beginner in Architectural Drawing

By V. L. SHERMAN

THE third article of this series will indulge just far enough in a very simple set of plans and elevations to point out the way for developing a sense of three dimensions. The plans shown in the illustrations are not complete, nor are they strictly identical. Still they will serve for argument, and are open to correction by anyone interested. The sense of the three dimensions is emphasized because all building drawing is really governed in volume, and plane drawing exercises are not as well suited for the beginner. It should be noted that this article covers very little of the complete set of drawings.

The house proposed is located as shown in Fig. 4, page 73, of the NATIONAL BUILDER for August. It is to be an inexpensive frame house on block foundation. There are to be five rooms, no pantry or closet on the first floor, a side entrance is to lead to a hall which will have access to kitchen, dining room, and living room, and which will separate the kitchen from the rest of the house. The living room is to be open, at the expense of wall space, and is to open on a brick paved pergola through two French doors. The dining room and living room ceilings are to join, and the stairs are to rise from near the street door, and are to have no winders.

The second floor requires no more hall than to accommodate the door-swing necessary for the two bed-rooms and the bath-room. The north bed-room is to be furnished with two three-quarter beds and a dresser. The south bed-room, the usual furniture.

A ground sketch was first made as shown in the last article. As the lot was only 120 feet deep and the trees pretty well back, little room was left in the rear of the house. To take the greatest advantage of the compass and the lot the size was judged as 23 by 25 feet with the axis of the house running with the length of the lot. (For an equal amount of floor area the square house has the least outside wall, and the longer the house is in proportion the greater the wall.) An experimental sheet, Fig. 1, was begun on co-ordinate paper. The use of co-ordinate paper is common in a good many offices besides the architect's, and has an advantage over the plain in rapid work in that the lines

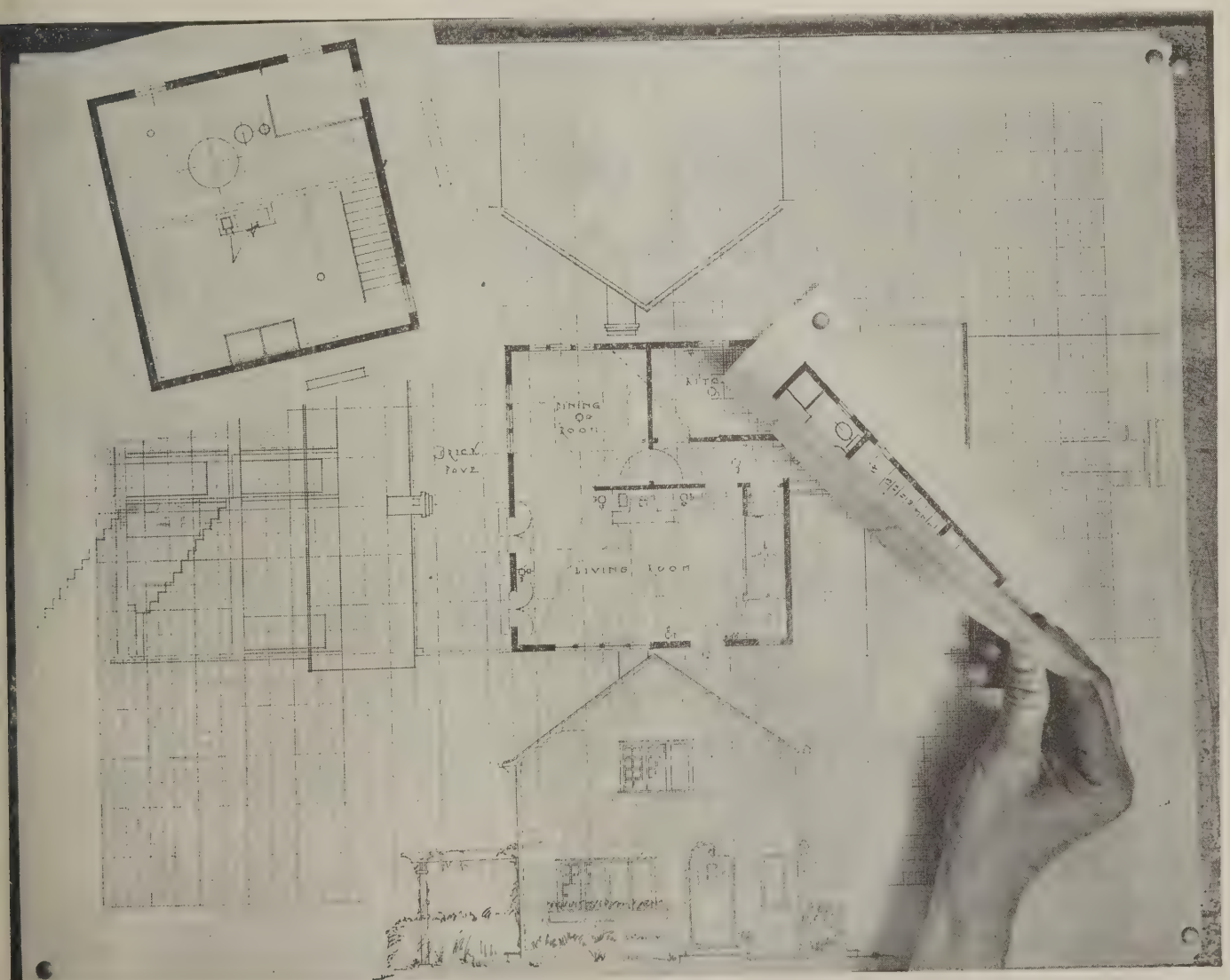


Fig. 1—Experimental layout on co-ordinate paper, using slips of tracing paper for basement and second floor plans

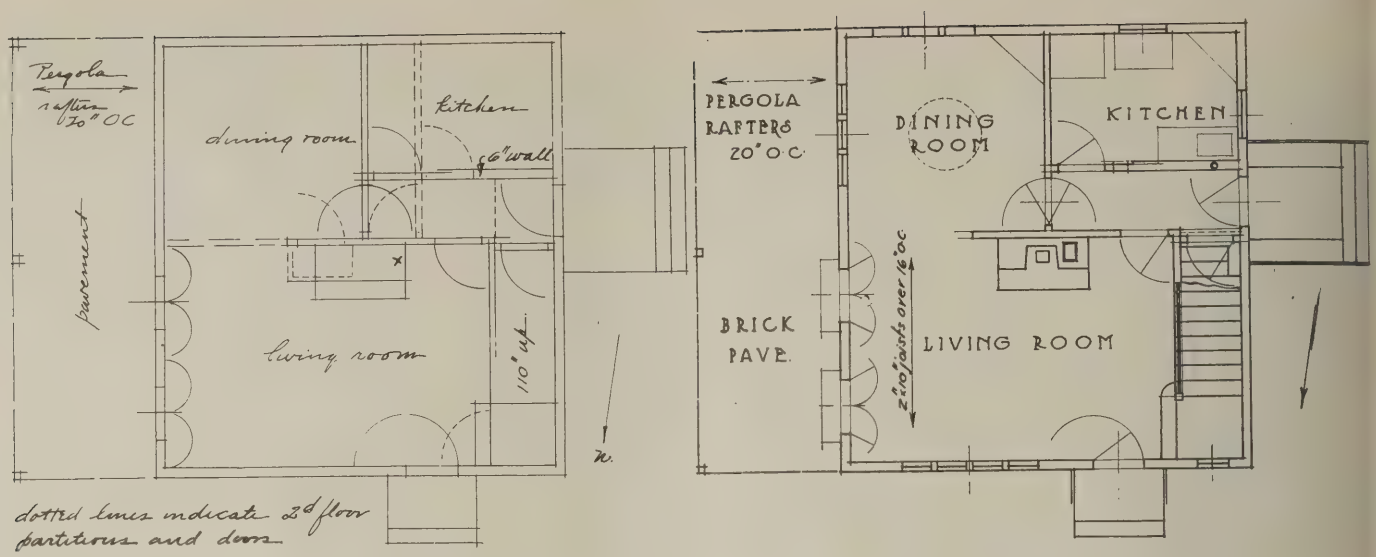


Fig. 2—Trial floor plan in light lines with dotted lines to locate second floor partitions and doors; first floor plan more fully developed

may be free-hand and the measurements checked off as the line is drawn in. The spacing on this sheet was 16 lines to the inch, and at a scale of ¼ inch to 1 foot one space amounted to 3 inches. The lines were inked in the illustration merely to develop contrast.

With the outer rectangle in place parallel lines were extended up and down and to either side; 8 feet 5 inches was allowed between basement and first floor, and 9 feet, 6 inches was allowed between first and second floor. A one-third pitch roof was judged about right, and the north elevation was tested out for proportion in height. To prevent a top-heavy appearance of the outline the dropped ceiling of the bed-room was lowered to 6 feet 0 inches at the east and west walls; (6 feet 0 inches is about the lowest possible, as a bedstead will stand some over 5 feet 0 inches and the ceiling will appear crowded.) With the roof drawn

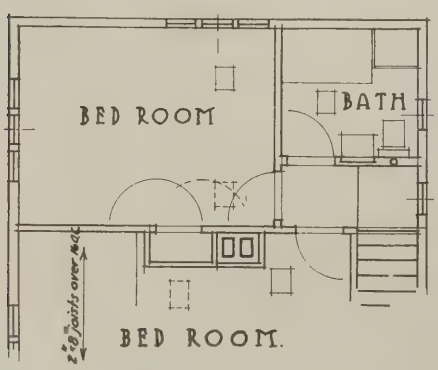


Fig. 3—Part of second floor plan as taken off first floor on tracing paper

in on 2-inch by 6-inch rafters, the heights were taken over to the right-hand or west elevation for trial. The result brought an argument for a lower roof with dormers, which was promptly ruled out, but with the suggestion accepted of masking the height with shrubs. You will notice that the grade line drops from the front to allow basement windows on the west side, and that, as proposed, the brick pavement at the east side raises the grade there even higher than at the front. It is essential to get the various elevations at least approximately before committing yourself to floor plans.

The rear elevation was then outlined and the east elevation was put in from the footing to the ridge. Floor and ceiling levels were indicated on three of the elevations. Going back to the first floor plan the first lines were drawn in much as in the left-hand section of Fig. 2. These lines should be fairly light. The dining room drew the south-east corner for the morning light, the living room took the north and the stairs lined the west wall. Dotted lines were then placed to answer for the second floor partitions. Outside doors were to be 2 feet, 10 inches by 6 feet, 8 inches, and inside doors 2 feet, 8 inches by 6 feet, 8 inches. Halls were to be at least 3 feet, 4 inches to allow full casings, and under the head of the stairs an offset of 2 feet was made to accommodate the side door. This is shown in Fig. 2. The kitchen wall was made 6 inches thick on the west to take care of the soil stack. (Keep the pipes away from the outer walls on account of freezing.)

Then came the experimenting with doors. In an ordinary house the swing of a door will knock off a great deal of floor space, but a 2-foot, 8-inch door in a small house calls for study. Compasses were set for the proper radii and trials were made. Finally determined, the doors were placed and the full swing marked. Don't be satisfied with a partial arc. Put in the full swing. Make the door as retiring as possible but convenient from every angle. By a bit of study doors can often be arranged so that rooms have privacy with open doors, so that it is not necessary to step back or around when opening a door, and so that opened or closed they are not an interference. Marking out doors and floor space in chalk full size on a wall and floor is not a bad way to examine you ideas on doors.

The fire-place was to be located near the center on the south wall of the living room, so after measuring off the length of a bed from the east house-wall, a closet was dotted in as shown in Fig. 2, in order to see if such a closet could be accommodated alongside two 8 by 12-inch flues from below. If this could not be done a part of the bathroom would have to be sacrificed, as interference of doors, window location, and wall space precluded any other position. Satisfied with the first arrangement the flues were marked and the breast of the fire-place was marked off as 5 feet, 0 inches. (It was really 5 feet, 1 inch counting 7½ bricks and the mortar.)

Taking up the east, or left side, elevation the first marks drawn were an offset of 2 inches in the north wall of the hall to allow for the side door of 2 feet, 10 inches. See Figs. 2 and 4. The offset allowed the full casing, and as it only includes the door to the basement is less noticeable than a scrouged casing. The hall could have been made 3 feet, 6 inches, but 2 inches is 2 inches

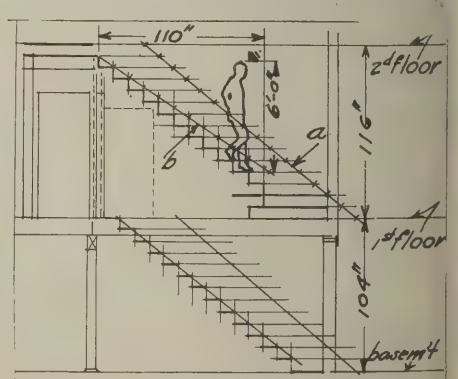


Fig. 4—Partial house section to reckon stairs

in a small house. To keep the stairs within bounds at the floor levels 15 risers was decided on for a total height of 9 feet, 6 inches. (Don't attempt to lay off risers singly to a fraction of an inch for there is always a slight error which accumulates as the number of risers increases.) Taking two risers from the living room and one from the upper hall left 12 risers and 11 treads for the main stair.

Paint as an Aid to Renting and Selling

Color Combinations for Exteriors

By ALBERT BRACE

A FAMOUS pioneer merchandiser is said to have advised his clerks not to talk but to show the goods! This was many years ago but go today into the palatial department store which still bears his name and you will find that policy still carried out to the letter. The clerks are unobtrusive alike in dress, manner and conversation; the fixtures, lighting and interior decoration offer a background that at once enhances your own sense of well being and sets off the most humble necktie or most gorgeous bit of jewelry to its maximum effectiveness.

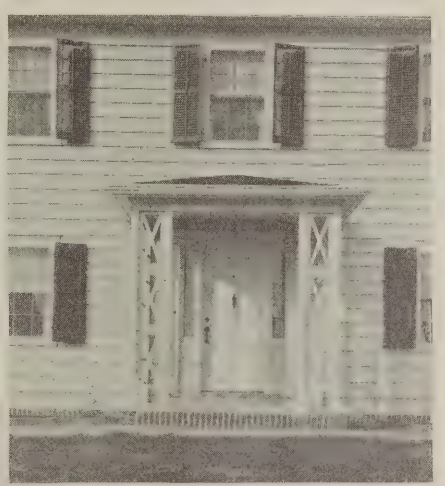
The net result is that without one word being said you *want* to buy though you may have entered on the most idle of time-killing shopping ventures — almost literally the only remedy, if you would save money, is to keep moving. Thousands upon thousands of people visit this store from all over the Middle West and practically the only sales effort exerted is that employed by their own eyes. The people behind the counter, scarcely uttering a word, display everything however trifling in just the right setting and make the change—that's all.

Is there not a sermon in this policy worthy of consideration by the builder selling or renting a house? If he adopts it, then the very first step is to see that his offering is given just that quality of external appearance which will permit the prospect's eye to do the work rather than a flow of hasty sales talk on his part. True, shrubbery, lawn and general background will enter in, but if the house itself is not of an appropriate color or shows poor taste in the selection of a combination, the rest will be very largely set at naught.

Leaving style out of the question we are as a nation entirely too prone to paint our houses as *we* like them, entirely without regard to the effect on neighboring color schemes and often in defiance even of natural surroundings. This is not to say that we should all take a course in the fine arts and then in landscaping to boot, but the observance of a few proprieties in external painting will make life pleasant for us all instead of good enough for just one. To be sure this is a free country and one may indulge consciously or unconsciously in exotic tastes, but while the result may be all right for the one who toasts his toes inside, how about the families whose porches open upon a vision of pink and white, green and orange or worse!

This parenthical lecture is intended rather for the private than for the professional builder—the latter as a class are too experienced in what is right to give any such pain to those about. Nevertheless an eye for color is not ingrained in us all and since more than one prospective purchaser or renter must be considered, a few remarks on the fundamentals of pleasing as many as possible may not come amiss.

Assuming that the question of painting a new house or group of houses arises in



This style house, with body in white and trim in blue, green, or blue-green, is very popular

a case where there are already homes adjoining, the first consideration is that of the color scheme predominating among the latter. If a decision is made regardless it is more than likely, unless the houses are widely separated, that the new dwelling will give a radically different effect from that originally pictured in preparing the specifications.

One reason lies in the fact that a light color placed next to a dark color makes the former appear lighter and the latter darker. Similarly a red house adjoining a green house intensifies the red color of the first and the greenishness of the second. At a distance these intensifications are not so observable but the closer one approaches the greater the effect becomes. All in all it is dangerous to employ a given color merely because a house observed somewhere else looked well under such treatment.

Aside from environment there are in the question of proper color, the factors of light and time of year and in these respects considerable may have to be anticipated. An all-white house may look bleak and cheerless on a plot devoid of grass, shrubbery or leafy trees—with these in abundance the effect will change to one of snug cosiness. Most houses are flattered by summer foliage; the test comes in winter when there is little to set off natural beauty or hide inherent shortcomings. The English style plaster houses with exposed beams stained in brown are a good example of all year 'round effectiveness.

Color preference in individuals is as it should be, a matter of personal taste, influenced according to age, temperament, sex, race, education and environment, but there are certain general laws and pleasant effects based on these that cost no more to attain than unpleasant ones. Color is a medium whereby a house can be made to appear larger or smaller, lighter or darker, more cheerful or formal—all important when it comes to selling.

To illustrate, if you would make a narrow tall house appear lower and wider, use a light color below any natural dividing line and a darker, heavier color above, including the roof. To make a house appear higher, use one color only from foundation to roof and that a light one. The trim in such a case should be a still lighter color and the roof given a medium shade. By painting a house in light colors, avoiding strong contrasts between body, trim and roof, a house may be given a larger appearance.

In general, it may be said that a darker trimming color makes a house look smaller; conversely a trimming color lighter in shade than the body color makes it appear larger. Blue and yellow expand, red contracts, tan, gray and pink have an enlarging effect. Light shades give cheerfulness while dark ones lend dignity and sedateness. The old-fashioned white with green blinds is always good if the grounds are reasonably spacious and filled with plenty of trees and shrubbery. Failing these, light gray, Colonial yellow, cream, ivory or Bedford stone will serve.

As a reaction from the gingerbread patchwork peculiar to the homes of the eighties and nineties the modern keynote is simplicity. Gone are the sombre greens and grays, the purposeless ornaments, turrets and gables, the pillars done in one color at the base and another at the cap. If there is any danger now it is in the overworking of white which increasingly threatens to extend to houses the styles or surroundings of which make such a treatment utterly unappropriate. In general it will be found safe to adhere

to some such general plan as that which follows:

LARGE COLONIAL

Body—White, light yellow or buff. **Columns and trim**—White. **Blinds**—Green or bronze green. **Roof**—Natural or moss green.

DUTCH COLONIAL AND GAMBREL

Body—White. **Trim**—White. **Blinds**—Green, turquoise or robin's egg blue. **Roof**—Dull green, dull blue, natural or multi-colored.

RUSTIC SHINGLED

Body—Brown, green or gray or dark red. **Blinds and Roof**—Same, in deeper or lighter harmonizing shades.

PLAIN TOWN

Body—Light brown or gray. **Trim, Blinds and Roof**—Dark brown or gray.

CLAPBOARD AND SHINGLE

Clapboard (lower half) and Shingle (upper)—Light or dark olive and dull red, cream and brown, gray and dark green or dull red.

BUNGALOW

Body and Roof—Browns and dark greens. **Trim**—Same, or white or ivory.

BRICK

Body—Red or buff. **Trim and Blinds**—White or apple green. **Roof**—Dark.

CEMENT OR STUCCO

Body—Gray, white or yellow. **Trim**—White or brown. **Blinds**—Turquoise blue or green. **Roof**—Red or dull green.

COTTAGE

Body—White (or silver gray). **Trim**—White (or lead color). **Roof**—Natural shingles (or stained dark gray or brown).

The importance of considering surroundings in deciding on the color treatment of a home is difficult to over-emphasize, and a few basic suggestions along this line may be in order. As has been said, white requires not only an appropriate style but plenty of trees and shrubbery to soften the formal effect and give a home-like look. Even when the leaves have gone the grays and browns of bare trees will perform the same service provided there are plenty of them. Black, of course, has no place at all except in lining sashes on a gray, blue or green body and for certain metal work.

Because it is nature's own color and omnipresent a large part of the year, green on bodies is a poor choice except in very dull tones on shingles or as a paint on houses crowded rather closely together on the outskirts of cities. It cannot vie with natural foliage and serves as an unintentional obscuring or camouflaging agent. Extremes are to be avoided and it represents the other extreme from lurid combinations of pink and white, blue and brown, etc.

If a very unobtrusive effect is desired that shall still be within the realm of good taste, dull browns, grays or yellows are best with trimmings in darker or lighter shades of the same color. For a house located on a plain without much relieving foliage or shrubbery, dark red, grays and browns are suitable without strong contrasts in trim. Outbuildings will tend to relieve any possibility of monotony.

Such outbuildings, garages, barns, stables, sheds, greenhouses, play houses and the like should be painted in harmony with the house. Painting them in odd colors would be as unpleasing in effect as a dining room furnished with an Italian Renaissance table, Jacobean, Queen Anne and Louis XIV chairs, a Sheraton server and an Adam sideboard. A patch work quilt is striking; what is wanted from outbuildings is an unobtrusiveness that adds to the general scheme of things. A good example of the right method will be found on page 54.

The roof coloring of a building is another important consideration. When slate was in its prime there was a depressing monotony that accorded well with the old-fashioned striving for "dignity." The great number of new roofings have brought with them much variety in the way of coloring, the color being an integral part of the fabric or metal. In the old days many of these would have been regarded as altogether too vivid but the discovery was made that combinations of individually strong blues, greens, browns

A stucco house is very effective in a one-tone green effect; a lighter green for blinds, downspouts, lattice work and pillars, a darker green for the roof

and reds give the same highly pleasing effect as an autumn landscape. Such autumn effects are, of course, most suitable on plain bodies like cement, rough plaster, etc.

In days now gone by it was apparently considered little short of heretical to paint window blinds anything but green, usually the rich "shutter green" of the manufacturer's prepared paint color card. Nowadays with the liberalism which permeates post-war America one can see in any representative suburb, the conventional green contending with at least an equal number of blues, blue greens, apple greens, buffs, grays, whites and even creams. Other trim, including sash, downspouts and grill work often follows suit especially on stucco, concrete or brick houses. Porch floors are usually confined to utilitarian tones of gray and brown, the steps and risers to match or the latter painted white or a light harmonizing shade. Porch ceilings unless natural wood varnished should be painted light gray, green or sky blue.

Getting back to the house as a whole there is a question as to color which is not always thoroughly appreciated. The relative durability of colors is a matter rather of pigment values than of artistic choice and is too technical a subject for extended discussion here; present purposes will be amply met by the most outstanding comparisons. Viewed from the practical angle, white is about the least durable of paint treatments, a house so protected being likely to require doing over in as little as three years.

The same house, done in a tint, that is white with a small percentage of color added, will not require repainting perhaps for another two or three years. Forgetting artistic considerations for the moment it may be said that blacks, browns and reds are the most durable whereas bright greens, blues and cold yellows are most susceptible to deterioration from sun and rain. Excellent compromises are the shades which in general make up the mixed paint color cards. These tints, aside from offering adequate variety, represent the pick of those light shades which tend to reflect the rays of the sun rather than absorb them as do the dark reds and blues and grays. Thus they give not only longer paint protection but assure a cooler house during the hot summer months.

Public Honor for Workmen

By Ethel G. Peterson

RECENTLY the Oregon Association of Building and Construction held a dinner at a Portland hotel. There were over a hundred present—architects, contractors, workmen, building supply dealers and realtors, so that in itself it was a notable affair.

But in connection with it there was performed a ceremony, unique in the annals of Oregon. Fourteen master workmen, identified with the building industry in Portland, were honored by the state, their fellow workmen and their employers, in being given guild badges or buttons.

It is a revival of the old medieval idea of the master craftsman, and was adopted by the association a year ago to produce better workmen, and to instill in the minds of workers the dignity of labor acceptably performed. It seemed to the association that it was essential that a new morale should be revived among workmen, that they should glory in the perfection of their craft.

The state of Oregon, through the department of public instruction, has fostered the idea, and the buttons were bestowed by J. A. Churchill, Superintendent of Public Education, who spoke on the high dignity of labor well done, and the necessity to maintain high standards of workmanship.

Of the fourteen workmen so honored, there were three plasterers, two painters, three plumbers, two electricians, three carpenters, one decorator.

These guildsmen need not necessarily be members of the association. They are merely workmen skilled above the average, whose fellows or employers have suggested their names. They are investigated by the association and if their performance is found to merit it, are nominated for the badges.

"I Always Have Plenty of Time"

By Roy M. Singer
Construction Editor, National Builder

WHILE roaming around the outskirts of Philadelphia I happened to see what looked like a big home building operation under full swing. Building of any kind interests me and so I decided to visit the work, thinking that possibly it might offer some items for my "On the Job" pages.

The closer I came to the work the better I was able to see how it was being managed and when I came within the boundaries of the job I recognized it immediately as being under the direction of a man who knew his business. I went into the office, stated the object of my visit and asked to speak to the man who was running the job.

Usually when I come into a contractor's office I get a courteous reception, but sometimes I don't. Here, however, in the office of Alexander R. Alessi, at Upper Darby, a suburb of Philadelphia, Pennsylvania, I had a very pleasant experience.

Alexander R. Alessi, busy builder of Upper Darby, Pennsylvania, who "always has plenty of time" to see his customers, no matter how unimportant their business

Mr. Alessi was pointed out to me. "I see you are a little busy now, Mr. Alessi," I said, after receiving a heart-warming greeting. "If you haven't time," I continued, "I'd like to call again."

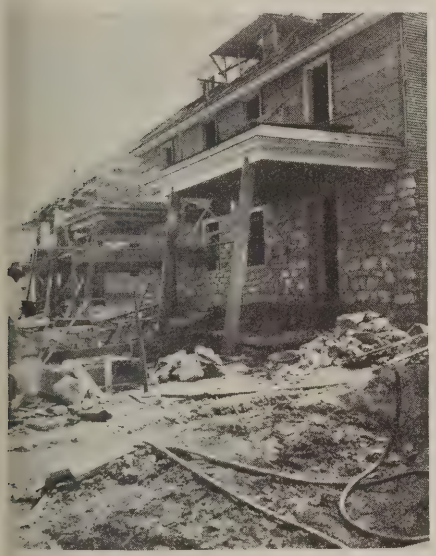
Mr. Alessi looked at me kindly and putting his hand on my shoulder said, "My good friend, I always have *plenty* of time." Then he took me into his office.

I asked him how long he had been in the building business. "Ten generations," he replied, and then he explained that to his knowledge his ancestors had been builders for that period back. "And beyond that," he said, "I don't know, but I don't doubt at all that some Alessi had a hand in building the old Roman roads." He then informed me that his father was a prominent contractor in northern Italy.

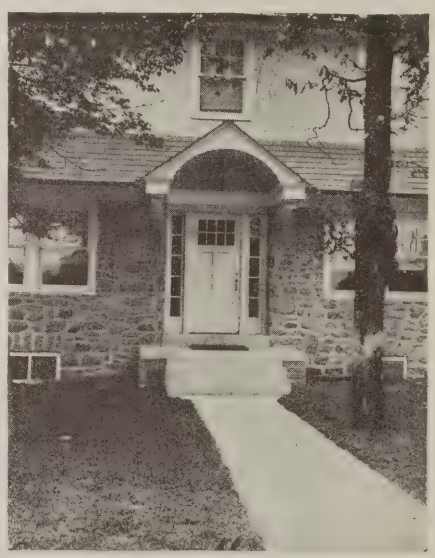
Like all descendants of the people who come from that sunny land, Mr. Alessi has artistic talent. Besides being a builder, he he is a sculptor and a musician and maintains a studio where he practices his hobby. He says it affords him relaxation from the work attached to building more than a hundred houses in a year.

While we were talking a woman came into the outer office. "I want to see Mr. Alessi," she said, and so she was admitted to the office where we sat. She had a grievance. When she saw me she turned to Mr. Alessi and said, "I suppose you are very busy, so I won't take up much of your time. I only——" Here Mr. Alessi interrupted her with his characteristic and pleasant Italian smile, "My dear Mrs. Chester," he said, "I always have *plenty* of time and I am always glad to have you stop in," and he listened while she told him of her trouble. Needless to say the difficulty was all smoothed out before she left the office.

So here then, to me, is the keynote of Mr. Alessi's success—"My dear friend, I always have *plenty* of time." A man with that spirit of courtesy is bound to be successful and it might behoove many of us to take a tip from Mr. Alessi, and "always have *plenty* of time."



Mr. Alessi always has several houses under construction at the same time



No detail that adds attractiveness or convenience to a house is omitted

A group of individual and two-family houses characteristic of Mr. Alessi's work. These houses are of unusually good design, materials and workmanship

The Building Outlook as Seen

WHARTON CLAY, Commissioner, ASSOCIATED METAL LATH MANUFACTURERS, Chicago—The metal lath business has never been better. We have shipped this year by June 1 more metal lath than in any previous entire year in the history of the industry. Orders fell off slightly after the New York meeting which requested building operations to "mark time," but shortly thereafter, when buyers realized that there was a vast volume of building in progress that would not stop, and that new projects were daily being announced, and that hundreds of others were on the verge of being started, buying immediately resumed, and has continued.

Wharton Clay

There is so much work of the latter class waiting for financing or waiting for a drop in the market that any slight recession in price, if there is any, will increase the amount of building, and once they are convinced that no recession of price is likely, they will realize that they are losing money by waiting and will start to build.

F. E. WEYERHAEUSER, WEYERHAEUSER FOREST PRODUCTS, St. Paul, Minnesota.—Generally speaking, I believe that the building outlook, country over, is such as to promise a continued substantial activity for a number of years to come. There is still a marked shortage of homes in the cities. The rural communities, which, during the last several years, have been forced to suspend all but the most necessary building operations, will eventually also have to catch up. I do not believe it likely that this latent building demand will, at any time during the next several years, take the form of a nation-wide building boom but rather that there will be sufficient building activity each year to absorb the production capacity of the building industry during which time there will be only a gradual and orderly readjustment of building costs. For the lumber industry I can say that production this year will be large—larger perhaps than for several years past. During the first seven months of the year shipments and orders have exceeded production and with mill stocks now subnormal it is not likely that the present temporary lull in the building business will bring about any marked price reductions. The demand for lumber from the industrial trade meanwhile continues good.

WHAT do you think of the present building outlook? Is business with you at the present time all that it should be? Is it better or worse, above or below standard? What do you think it will be during the next thirty days? These are the questions that National Builder has asked of leading men in various branches of the building industry—manufacturers of all kinds of materials, contractors and builders, lumber dealers and architects—and men in various parts of the country. Many of the answers to these questions are printed herewith. The purpose of this questionnaire was to supply the readers of this journal with a reliable estimate of present building conditions and an authoritative composite view of probable future conditions, as seen by men who are in a position to know and whose opinions count for something. There are any number of business "thermometers" published today—figures without end. These figures may not lie but often they do contradict each other. As a rule, predictions based on these indexes are quite vague and noncommittal and, in the majority of cases very much too general to be of any direct benfit to this or that particular branch of business. National Builder, in presenting the opinions on these pages, is getting away from these general business surveys and giving its readers the benefit of the judgment and knowledge of men who are interested specifically in the building industry as their business. These opinions, carefully considered and balanced should be of definite, concrete help to the contractor and builder in planning his work for the next few months.—The Editor.

A. T. CAVEY, THE RICHARDSON COMPANY, Lockland, Cincinnati, Ohio—This is the time of the year when dealers in asphalt shingles and prepared roofings should plan their sales campaigns for the fall.

A. T. Cavey

Leading manufacturers are stimulating the use on the part of property owners everywhere by reason of well planned advertising campaigns.

Roofing products, unlike many other building materials, are being sold at practically pre-war prices. There seems to be a stability in the price structure that should dispel any skepticism on the part of the buyer, as roofing prices are altogether too low and should advance.

C. J. PARSONS, General Manager, THE DIAMOND METAL WEATHER STRIP COMPANY, Columbus, Ohio—Judging from reports sent in by our 580 agencies in 38 states would say that the present building outlook was never better.

C. J. Parsons

In our particular line our business has shown an increase over last year (up to date) of 128 per cent, most of which is traced directly to new building operations. The only possible chance of decreased operation is, in my humble opinion, that labor has a tendency to become unreasonable in its demands, thereby discouraging the prospective builder who would feel inclined to wait until prices were fair and in accordance with the times.

The same applies to material situation. There are some people who take advantage of the laws of supply and demand and put exorbitant prices on what they supply, thus getting more than they are entitled to, which also discourages the prospective builder.

The level-headed far-seeing supply man or mechanic knows that a permanent prosperity cannot exist under a system of unfair prices and governs himself accordingly. This kind of man will be eating chicken when the other kind are eating snowballs.

W. WESLEY ROSS, Route 2, Friedens, Pennsylvania, carpenter and contractor.—The building situation in my district is rather encouraging, although being located in a small town or rather a rural district, we can't expect much of a building boom. Building activities are a steady blow, with prospects good for low and medium-priced buildings. I am pleased to say I have been doing the better class of building in my section for the past 28 years. The majority of our buildings are of wood construction, some few brick, some brick and stucco, bungalow style. Building material is 10 to 20 per cent higher than in 1922; wages are higher, both labor and mechanics, carpenters 75 cents to $1.00 per hour, bricklayers $1.10 to $1.25, plasterers $1.00 to $1.25, labor 40 to 60 cents and far too few of all classes. What is the solution? Not sufficient of our young men taking up the different trades. I explain to our young men that there are far better facilities right now in taking up a trade than I had when I went out on my first job 45 years ago.

by Leaders in the Industry

J. H. PETERSON, THE D. J. PETERSON LUMBER COMPANY, Toledo, Ohio—The sun continues to shine on our local home building field and we, as retailers in Toledo, can see no black clouds hanging over the horizon predicting stormy weather for fall trade.

J. H. Peterson

Four months ago storm signals were raised by commercial market forecasters and financial pessimists which, fortunately, have not been heeded by the home builder and, perhaps also fortunately for him, they have been heeded by the retail lumberman.

The result has been that the retailer curtailed all speculative buying during that time, and adopted a hand-to-mouth policy of buying in the face of a brisk selling trade. At the same time the manufacturer was at the peak of production and has been forced to lower prices.

This lowering of prices has been reflected in the lowering of Toledo retail prices in spite of the fact that the home-building demand has not lessened, which bids for a good healthy fall trade.

The bank builder, the hotel builder, the builder of large office buildings may stop-look-listen for a short time, but sooner or later he will also bow to the demand.

OWEN T. BARRY, President, HAWKEYE LUMBER & COAL COMPANY, Cedar Rapids, Iowa—Business was very slow for the most of August, though previous to that time our own volume had outstripped all records of our 23 years' business here by the Dam Site.

We have sold and have ready for delivery within the next ten days or so a very large volume of new houses, both large and small. We have others in sight, which unquestionably will go ahead. The slight recession in prices is also encouraging if properly handled. The situation in Cedar Rapids has been such that we had not followed the market up, our prices having been based upon January market for the season.

The opening of bids yesterday for a new court house here has proved beyond question that building is reasonable in price. The architect stated as follows:

"Before the bids were received, it was thought the total would be about $700,000. The bids received were the lowest I have seen in more than four years—approximately the lowest by 20 per cent. The total cost will run approximately $100,000 less than we had expected."

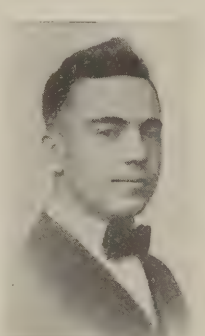
E. H. WOLFF, ILLINOIS ZINC COMPANY, Peru, Illinois—There has been a decided "slowing up" in the volume of rolled zinc we supply for building purposes, which is attributed to the prevailing trend of the building industry as evidenced by press reports throughout all sections of the country. Apparently many building projects have been abandoned or laid aside because of constantly increasing costs.

E. H. Wolff

The zinc market is below normal and, while the value of such quantities as may be used in a given construction would have little effect upon the total cost, it should be noted that our metal as a building material or as one item of cost, is low in price when compared with pre-war years. The average slab zinc market during 1922 was over $20 per ton below the average for 1912. The average during the first half of 1923 is probably no higher than 1922.

When these market conditions are considered, together with the fact that in 1912 most zinc producers were operating at about one-third their present labor cost, it can easily be seen that the zinc industry is not as it should be, nor is there a prospect of betterment in the near future unless there is a revival of consumption.

V. A. BANTA, General Contractor and Architect, Centerville, Iowa—The building industry will be on the increase inside of the next thirty days; that will be gratifying, especially in the rural districts. The past decline in the contracting business, due to inflated prices, was in some instances blamed onto the contractors. Due to the shortage of skilled labor, contractors have been forced to pay large labor costs that were beyond normal. The present need among contractors is a little more co-operation among themselves and a system for the training of skilled workmen for future business. Contractors should turn their attention more to the home owners' needs. A long line stands waiting ready to build homes if the prices can be made within reason and more universal.



V. A. Banta

F. M. PINNEGAR, General Sales Manager, THE KELLEY ISLAND LIME & TRANSPORT COMPANY, Cleveland, Ohio—The building outlook is very good; although considerably eased up over the early months of the year; during which time conditions were abnormal. We believe the industry as a whole at present is more stable and will remain so throughout the balance of the year. The lime industry at present seems to be enjoying a very healthy condition—about up to standard for this season of the year, and although there was a slight falling off in the demand for this commodity during the extreme hot weather, recent increased activities would indicate that the demand would pretty well equal the supply for some months to come. We have made a careful survey of the situation and find it as stated. We believe, however, that the length and extent of present activities would be increased greatly by everyone boosting and at the same time receiving hearty co-operation of such good publications as your own.

F. M. Pinnegar

C. J. SCHUEMACHER, A. I. A., SCHUEMACHER & FINKELHOR, Architects and Engineers, Sioux Falls, South Dakota.—We have a very peculiar circumstance from an architectural standpoint in the state of South Dakota, primarily because we are a state of approximately 70,000 square miles with the small population of approximately 750,000, the greater part of this population rural, with very few leading cities. The metropolis of the state is Sioux Falls, with 30,000 population.

We have Indian reservations on which practically the only building to speak of is what is done by the Government in taking care of its Indian population. We are a pioneer state, it having been only 39 years since we were a territory.

Except for the gold mines in the western part of the state, or Black Hills, we are practically an agricultural state with unlimited circumstances arising bringing about poor crops which results in a retarded building program at irregular intervals.

Owing to the extreme winters it is compulsary that building go ahead in the spring and summers of each year leaving practically no building or very little, for winter.

There has been, in 1923, more building

in this state than we have ever seen before over a same period of time. Business at the present time, in the architectural profession, is below the universal standard but above previous standards thoughout this state which has been due to the lack of proper legislation and building laws, typical of a pioneer state.

Practically all of the architects have been compelled to deal with a population, some of whom have never heard of architects, therefore being at a loss to realize the necessity and importance of such a profession. Then too, the more thorough architects have been confronted with the lesser painstaking members of the profession who have appealed strongly to the average client because of the small fee charged, making it tremendously difficult to maintain a high-grade organization which might serve the public in a high-class manner, serve the state in the way of better buildings, and to serve the individual as is done outside of this territory.

This will probably continue until the communities accepting the services of the less thorough architects see and realize what is being done in other communities where fees have not been the predominating factor. Except for the small private work there will be practically no building in this state until next spring.

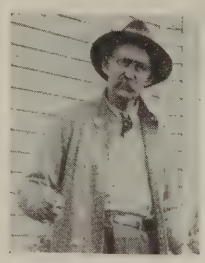
Again because we are an agricultural state and because we have comparatively fine crops this year, and except for a tremendous fall in the marketing price of these crops, the architects and builders of this state are looking forward to a building program next year which will be somewhat larger than 1923.

HAROLD ST. CLAIR STARIN, Registered Architect, Duluth, Minnesota — In Duluth, building costs are somewhat lower than they were three months ago. To a slight extent this is due to the fall of the wholesale prices of a few commodities, but more especially to the slackening of work during our usual summer lull and a consequent increase in the keenness of competition among the contractors and sub-contractors. Observing this, the public are inclined to hold off for lower prices. In this I believe they are mistaken. This section of the country is still far behind its need for buildings. As we have avoided an excessive rise of building costs here, so we will avoid an excessive fall.

Harold St. Clair Starin

I expect prices to remain at about the present levels through the fall and winter, with business remaining dull. In the spring I expect to see a large volume of work and the owners will pay for their procrastination.

E. P. McCASLIN, Carpenter and Builder, Indianapolis, Indiana—Here in Indianapolis everything in the building line is booming. Last autumn at close of building season I feared home building was being overdone, but it seems I was mistaken. Up to two months ago I confined my work to garages only, but was asked by a man who is part owner of a large tract in the eastern part of the city, recently plotted, to go in with him and build a few good substantial cottages of five to six rooms and see what would happen. Well, last week we put out a sign reading: "For sale: $500 down and payments like rent for balance." We had to take it down within two days. Three customers appeared almost simultaneously. The first bought the cottage, the next two wanted to buy it. Labor is fully employed at good wages and wage earners are free spenders, and high rent is a most potential persuader to prudent men and women to own their own homes. Our most attractive features are a full basement, with large windows, window seat with cold air vertical grating in front of same, ironing board in wall, and in-a-door bed. Then we have well finished floors, attractive lighting fixtures and convenient outlets for sweeper, floor lamps, etc. These little things count, and are not expensive as would be a lot of hips, valleys, dormers and false gables. All these we avoid in the interest of economy and not a customer has suggested any change of plan. Like a noted maker of automobiles, I pin my faith to catering to those of moderate means. When the house and price are right, they are going to buy. A small, neatly built garage is also a "life-saver" and can be erected at a cost of less than $130, with cinder floor. As to large construction, I cannot speak with knowledge, but for those who build to a simple, neat, economical plan, use good materials and do not "throw" their work together, the end is yet far in the future.



E. P. McCaslin

JOSEPH P. GLASER, General Sales Manager, CHAMBERLIN METAL WEATHER STRIP COMPANY, Detroit, Michigan—I look for building to continue fairly brisk throughout the rest of the year. The number of new projects will probably not be as high as those starting the first half of the year, but the building industry as a whole will be active.

The weatherstrip business has been good, our own volume being 50 per cent ahead of the largest previous year. The gain is practically the same in all parts of the country and I believe reflects the condition of the building industry. We believe that our own business will continue good the next 30 days—in fact, will continue good throughout the balance of the winter.

H. T. McCLUNG, Advertising Manager, FLAXLINUM INSULATING COMPANY, St. Paul, Minnesota.—We see nothing disconcerting in the present outlook. Early this spring dealers predicted a decided summer slump and the falling off which has actually occurred has been in most cases less than anticipated. Gloom continues to hover over the agricultural districts but since home building in these parts has been at a standstill for almost two years, there is no reason for exaggerated pessimism in that quarter. City dealers anticipate renewed activity this fall and suburban building in the larger centers seems to be holding up well. Competition is keen and buying close and to us it looks like a good year for the dealers who can give a real service and who are selling well-known products upon which there is the smallest tendency on the part of users to force a cut in price.

RALPH P. STODDARD, Secretary-Manager, THE COMMON BRICK MANUFACTURERS' ASSOCIATION OF AMERICA, Cleveland, Ohio—From the viewpoint of the common brick manufacturers, the building outlook for the balance of 1923 is good. There are indications that the volume during the last half of the year will not be as great as during the first six months.

Ralph P. Stoddard

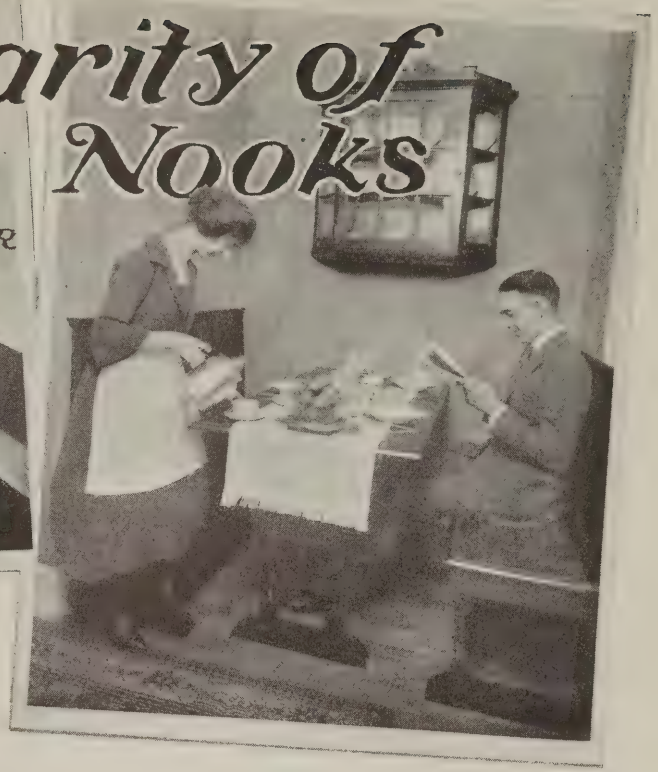
An abrupt slacking of new orders was apparent in practically every section of the country during the latter part of June. New business stopped so suddenly that many manufacturers were alarmed. This condition, as developed, was to some extent at least seasonal, and there has been a resumption in the business which has turned some of the most pessimistic manufacturers back into the optimistic ranks. In the larger building centers the manufacturers are well supplied with orders.

In the strictly agricultural regions, especially the states just west of the Mississippi, the building boom has not yet taken effect with full force and that section is peculiarly sensitive to any depression as far as construction is concerned. The Pacific Coast is going strong. New York and Chicago manufacturers are busy, and in all industrial regions there is a volume of construction that ordinarily would be considered large even though it may be somewhat below the average of the preceding six or seven months. The fact that much building is yet actually needed gives strength to the belief of the brick manufacturers that his material will be in strong demand, not only for the balance of 1923, but for a number of years to come.

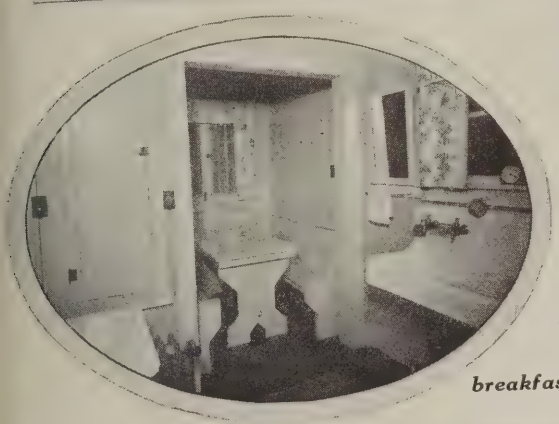
The Popularity of Breakfast Nooks

By H. T. Becker

Just a table, bench and chair for the kitchenette



Where the dining alcove is the only dining room it is usually finished dark. The hanging china closet is unique



An old pantry now a breakfast nook

Could anything be more inviting than this alcove in mahogany and ivory finish and its tiled floor? A plate glass covers the doilies

NOWADAYS, practically every house that is built includes a breakfast nook, in some form or other, and many a remodeling job is based upon installing one of them in a house already built. This fact was brought home quite forcibly recently in a house-planning contest which was held by a widely-read magazine. In the 6000 plans submitted of ideal homes, the demand for dining alcoves—"dinettes" or "Pullman" alcoves our California friends call them—was so great that the judges called it universal.

The advantages of one of these labor-saving conveniences for the housewife who has to serve hurried breakfasts and lunches and between-meals snacks for hungry school children, need hardly be enumerated. Most housekeepers regard them as just a plain necessity. In fact, in some of the most attractive small cottages that are being built, the dining alcove is the only dining place in the house—unless the living room be commandeered for that use on state occasions. And why not? They take only a fourth as much room, and very often the formal dining room is used less than once a day. Why not cut down the expense of building the house, and the overhead of upkeep, and the labor of housekeeping, by just abolishing the unused room and substituting a delightful cozy breakfast nook?

The sets here pictured are recommended for use in a space four feet six inches deep and five feet six inches to six feet wide. Where space is more limited than this, there is a folding breakfast table of about the same size that folds up into a wall cabinet when not in use. When wanted for a breakfast table, it is let down, and kitchen chairs drawn up.

A dining alcove can readily be installed in what was formerly a pantry, or rear entry. Sometimes a small portion of the back porch can be appropriated. A favorite way is to have the table and benches set into a corner of the room.

It might be mentioned in passing that in a good many instances a dining alcove was used in other rooms than the kitchen also. One contractor friend had one in his den, and found it a wonderful help when figuring plans and talking to prospective clients. One woman found it an excellent study-and-play alcove for her children.

KINKS From the Job and Office

By V. L. Sherman

The Septic Tank

THE following letter and sketch, Fig. 1, comes from W. H. S., of Baldwin, Long Island. "In the NATIONAL BUILDER for July, F. C., of Plymouth, New Hampshire, discusses septic tanks. I differ with him in what he seems to think is general practice. The outlet in a properly designed septic tank should be below the inlet. It is well to provide a grease-trap but in practice it is seldom done. I have been building septic tanks for several years and have not found it necessary to use a separate grease-trap, although I think it would help conserve the anaerobic bacteria. The whole trouble with septic tanks is that they are such in name and not in *fact*. A properly designed septic tank will handle the sewage for many years without any attention and without any odors. I have built several genuine septic tanks as front porches in fine residences, and find that their presence is not known unless attention is called to it.

"The first one I built as a front porch was the only logical place that this tank could be put, and it was with some doubt that I tackled it. I mastered it, and since that time I have built several more which give entire satisfaction. Do not think you can build a septic tank unless you understand the principles on which they work. And by all means use a good syphon valve and proper ventilation. Every tank should be designed according to the number of persons expected to use it, and the amount of field tile proportioned to the capacity of the "dosing" chamber. There can be no hard and fast rules regulating the size as there are so many elements to consider, soil drainage, character and composition of soil, etc."

An Impromptu Mixer

H. C. W., of Ephraim, Wisconsin, forwards two photographs, Figs. 2 and 3, of a mixer. He writes that while the locality of orchards is 30 miles from a railroad there is no hesitation among the builders in manufacturing their own labor-saving devices. This mixer has a couple of cousins in the way of stump-puller and saw mill. Since the concrete work is sporadic a small mixer of this type works very well. It consists of a chassis mounting a small gasoline motor at one end and the mixer at the other, connected by belt. A pork barrel was mounted on a bevel gear set taken from a mower, and power transmitted through bearings from a sprocket drive, the latter running from the pulley shaft. A ring around the barrel rode two small sheaves. The barrel and bearings for the final drive were nested in a frame mounted eccentrically with the small sprocket so that on tilting the barrel the belt was slackened. The barrel was lined with spiral paddles.

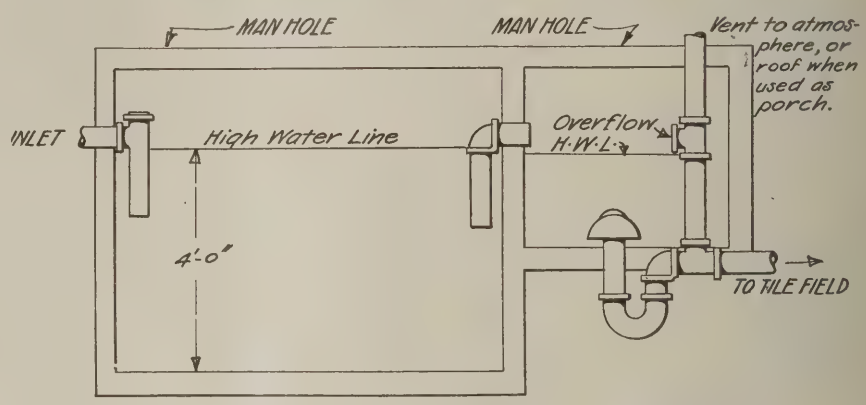


Fig. 1—Arrangement for septic tank as used for porch

The editor knows that the cement walks of Ephraim detract nothing from Wisconsin's reputation in the use of concrete, so he hopes he will hear something of the stump puller.

An Improved Corn-Crib Door

A DOOR section for relieving the pressure from the outside door, and one

Fig. 2—Mixer built from mower gears and pork barrel

Fig. 3—Dumping from the mixer

that will hold small grain, is submitted by H. F. C., of Wye Mills, Maryland. Referring to his sketch, shown in Fig. 4, he says: "You will note from this that a corn-crib or granary can be filled and boards 1 by 6 inches put in place as you need them. Any

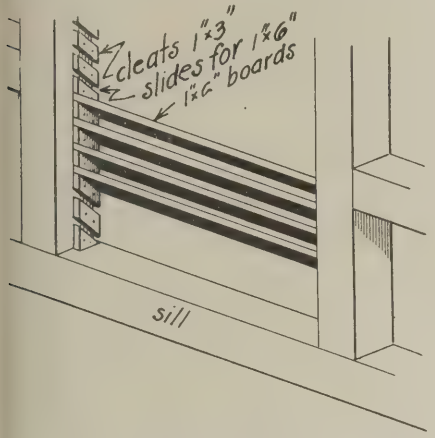


Fig. 4—Take-down louver for corn-crib door

board can be removed easily from top or bottom. In some cases people cut short boards and lay them across the inside of the door post to relieve the pressure from the door. Then when the corn is shelled they have to be cut out with an axe."

Constructing Ellipse With Cord

C. S. M., of Nebraska City, Nebraska, writes: "I notice that your correspondents are still discussing the ellipse. This happens to be a figure that I have had con-

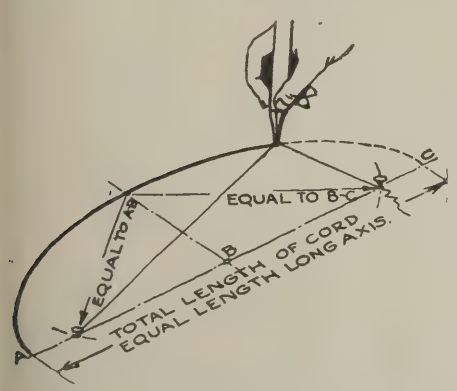


Fig. 5—Drawing an ellipse with stretched cord

siderable occasion to use and I think that my method has them all beaten for simplicity, speed, and accuracy." We believe C. S. M.'s method as shown in Fig. 5 is fairly clear.

A Simple Speed-Counter

TACHOMETERS are not always available but this little instrument submitted by G. A. L. fills the bill for those who want to determine the speed of a shaft (Fig. 6). "This simple method was recently demonstrated by the owner of a portable sawmill. It is required to get the revolutions per minute of the saw so as to allow for the proper cutting speed. The owner used a threaded rod with a knurled nut. One end of the rod bore a triangular point and the other the head Placing the point in

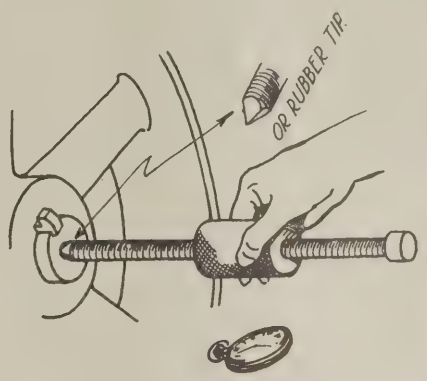


Fig. 6—A simple tachometer

the center hole of the shaft, the nut was held stationary for a period of 15 seconds, more or less, depending on the velocity of the saw and the length of thread on the rod. With ten threads per inch on the stud it was only necessary to measure the advance of the nut in the given time to determine the rate of the shaft."

Handsome Is As Handsome Does—An Old Saw

D. W. L. of Indianapolis writes: "I can testify that H. H. S. suggested a very good thing in saws in the NATIONAL BUILDER for July. I am sending you a picture, Fig.

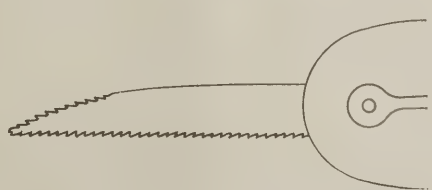


Fig. 7—Another handy saw

7, of a very handy tool. It is the best tool I ever owned for a hurry-up job

"Most carpenters know how handy a good compass saw is and many of them realize the value of a nest of them for one handle. As long as some few saws may not be used roughly the best of mechanics will occasionally break them off and, like myself, throw them away as worthless. However, I did keep an old, broken blade so I put the top corner in a vise and broke it off, ground it pointed, filed it to the top point, and find it a very handy tool. Especially for lath and sheathing where one is cutting in openings you do not have to dull a good bit, but get started through a crack or nail hole."

Hydrant Shutoff Insulator

D. R. VAN HORN, of Walton, Nebraska, submits the following letter in connection with the photograph, Fig. 8. "An inexpensive and thoroughly satisfactory method for building a hydrant with anti-freezing shutoff. The water is piped to the

Fig. 8—Protected hydrant shut-off

top of the ground as usual, then the earth is dug out from about the shutoff valve and about a bushel of gravel is dumped in, and on top of this is set several sections of bell-end tile to above the ground. After the tile has been placed a tin can cover from a half-gallon syrup can is punched in the center, and this is slipped over the rod and set in the end of the tile as shown. This forms a dead air space which prevents freezing of the valve below yet which always remains free from refuse. Any water leaking out is absorbed by the gravel and seeps away."

Opening Rolls of Roofing

F. B. of Norristown, Pennsylvania, writes that he used to "spend a lot of time screwing the nut off the rod placed to hold the ends on a roll of roofing. A heavy hit with the hammer on the nut end of the rod will send the nut through the metal end-cap and release the metal ends. This was found to be a great time saver, especially when there was a burr on the end of the rod to stop the nut from coming off. I keep some of these rods for re-enforcing small slabs of concrete."

Southern Colonial

F. H. wishes to know something of the form of what is called the "Southern Colonial" house with the very high columns in the front and whether that type of building is at all in vogue at the present time. The editor submits the sketch, Fig. 9, as one of an extremely old homes in the South, probably dating from the

Fig. 9—A Southern Colonial home

younger days of "Bre'r Rabbit," which is very attractive and well liked at the present day. He knows of two homes, very recently remodeled, and in the same town, which were so built originally as to lend themselves to this type on remodeling. Both houses were developed into very attractive homes and are well known. One, a rather mediocre place before remodeling, has become quite famous.

A Correction Regarding Efflorescence

WE take the liberty of publishing the following letter in regard to efflorescence on brickwork, written by Mr. H. S. Brightly, of the Indiana Limestone Quarrymen's Association.

"In the National Builder for July there is an article on efflorescence on brickwork. Mr. Cabot, in summing up the cause for efflorescence, states that 'The efflorescence is never due to the bricks alone, and seldom to the lime alone.'

"From the results of tests made recently at the Bureau of Standards we beg to differ with Mr. Cabot's statement that efflorescence is *never* due to the bricks alone. Just recently it was noted that greenish discoloration and efflorescence appeared on the stone work of an important memorial building in the East shortly after work was completed. It was known that this trouble could not occur from anything contained in the limestone and a careful analysis of the surface deposit on the face of the stone, and of the brick and mortar work for backing up this work, developed that neither the stone nor mortar was at fault, and traced the trouble to vanadium in the brick which had been leached through stone in drying out walls by the moisture absorbed into the brick work as a result of these walls having been exposed—uncovered on top during several weeks of rainy weather.

"We have a definite statement from the Bureau of Standards chemists that this trouble was caused by the metallic element in the brick."

Dry Rot

MANY of us are at sea on the question of dry rot, and we effect to hide from it as we do from other unknown bogies. The following extract from "Wood Preserving News," published by the American Wood-Preservers' Association, has this to say:

"Dr. C. J. Humphrey, pathologist, Forest Products Laboratory, Madison Wisconsin, recently returned from a month's investigation of the dry rot situation in buildings and lumber yards of Alabama, made at the request of the state commissioner of conservation. In discussing the results of this investigation Dr. Humphrey stated: 'The fungus causing most of the trouble is *Poria incrassata,* which was discussed at the January meeting of the American Wood-Preservers' Association and mentioned in the May "Wood Preserving News." The damage in the state of Alabama alone will run into millions, as indicated by the numerous cases investigated personally or reported to me by contractors, architects, lumber dealers, etc. Repair costs running up to $17,000 for a single residence have been reported.

"'Lumber yards are frequently infested with the rot and efforts are being made to free them of the infection so as to assure builders of a clean supply of stock.

"'In view of the seriousness of the situation it is hoped that the wood preservers throughout the South will do what they can toward encouraging the use of treated timber for the lower floors of buildings. It is believed that a considerable business in this line can be gradually built up. Wood preservers can thus render a service of inestimable value to the public, and at the same time extend their business on an eventually profitable basis."

Chalk up another point for Alabama. As always, the bogey will disappear when it is known.

An Habitable Basement

THE following letter may be of interest to some who use their home as part work-shop. "As a contractor in a small town I kept an office in town as did the rest, but I found so many occasions when I had to get up from my easy chair, and go to the office to settle some matter, that I began to consider. There had been articles in the papers on how to fix up the basement as a dining room, work-shop, billiard hall, etc., and the heating companies had advertising pictures of beautiful and picturesque rooms. Then one day I ran onto a place being built by a brother contractor for a newcomer in town. After pouring the walls for the foundation he had given them an inside veneer of pressed brick with blue raked joints. That looked good to me.

"If I had an office at home that proved especially attractive, and my clients could call at the house as they might at a doctor's house, and if I didn't have to hop up so often, everything would be fine. I got ready to sell out and build again for myself.

"The basement in the new place averages five feet below grade. A fairly large portion of the basement, at the foot of an open stairway from the first floor, is walled off in brick to match the pressed brick veneer of the foundation walls. The floor is very slightly pitched toward the inner basement door, and is smooth blue cement finish. There are two pairs of diamond-pane casement windows. The ceiling is false beams covering the joists. I have kept the piping away from that corner of the basement ceiling to avoid any dampness. But the best piece of construction is a big fireplace built into the base of a three-flue chimney. I use wood so the ashes from the fireplace are not bothersome, and in the summer the front of it is screened and the damper left open. This helps to keep the air fairly dry and keeps the flies out. The whole thing has added very little to the cost and gives me a comfortable and inviting home office."

An Adaptable Sun-Dial

"SOME time ago," writes T. L. S., "you published some matter on the sun-dial. I am sending the picture of an old sun dial (Fig. 10) which may be used in any latitude. You will notice that the rod, or gnomon, passed through to a quadrant which is graduated to suit the degrees of

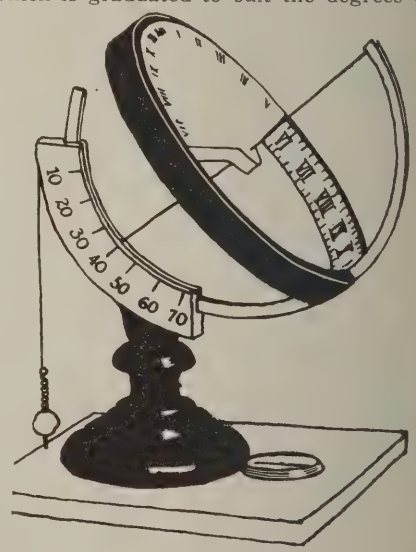
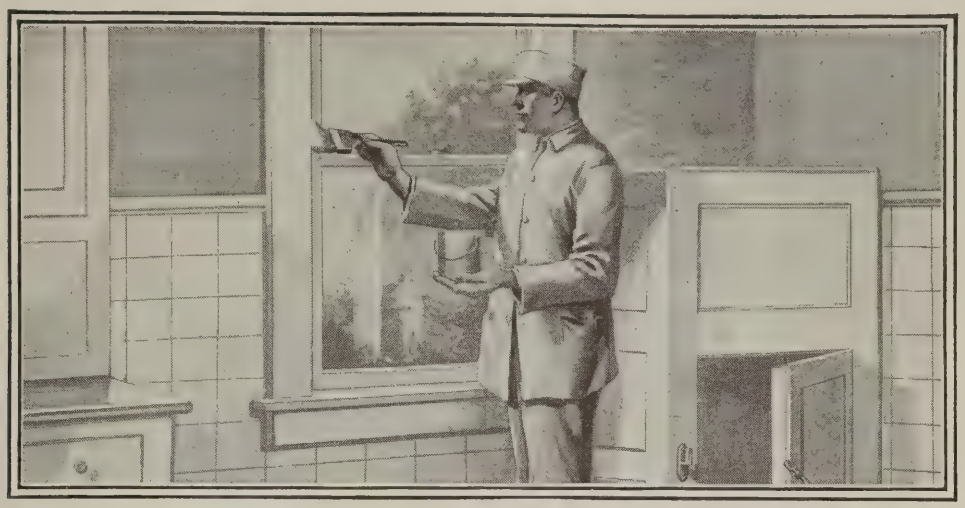


Fig. 10—A universal sun-dial

latitude. That is, for any particular latitude the dial is tilted so that the rod comes into the proper degree. A plumb-bob is attached and a mark is given on the base so as to bring the instrument into its proper position. There is also a compass sunk in the base so that the dial will point directly north. Of course to be really correct the deviation of the compass must be known and an allowance made for it."

For Light, Cheerful Rooms



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Of General Interest

Aluminum Paint Makes Radiators Less Efficient

THE aluminum or bronze paint generally applied to radiators greatly reduces their effectiveness and makes it necessary to have a larger surface for the same heating effect, according to experiments performed by Dr. W. W. Coblentz of the Bureau of Standards. Dr. Coblentz finds that the heat radiated from an aluminum painted radiator surface is less than a third of that emitted by a radiator of the same size painted with a non-metallic paint, enameled, or simply allowed to rust.

On the other hand he finds that aluminum paint is a very effective means of reducing the amount of heat transmitted through a thin material. Applied to the under side of a tent or awning it reduces by three-fourths the amount of heat from the sun which gets through the cloth, while if used on the cover of an automobile or ice wagon it cuts in half the heat let through and makes the temperature inside the vehicle more nearly that found in natural shade.

Sell Houses Over the Counter

AMERICAN department stores long have been celebrated for the variety of merchandise carried on their shelves, but it has remained for a Chicago store to touch the limits of "over the counter" merchandising with the opening of a department where completely erected houses, including the ground on which they are placed, may be bought. The department is said to be successful.

The houses are set on lots 33x165, are 24 feet in width and of brick construction.

One of the last acts of President Harding's career of interest to the building industry was his participation in the dedication ceremonies of the "Home Sweet Home" house on Sherman Plaza, in Washington, D. C. This photograph shows Mr. Harding receiving the key to the house, and it caught him in a pose peculiarly suggestive of the kindly, courteous character of the man who was one of our best-loved Presidents

No two exteriors are alike, so that each house has an individual air. They are heated with hot water, have open fireplaces in the living rooms and built-in bathtubs, bookcases, buffet and linen drawers, ice boxes, shades and stoves, etc.

Electricity lights the houses as well as the sleeping porches and a built-in ironing board gives added service, as well as a clothes chute.

Each house has an attic, which is partly finished, and this may be converted into a second story if the owner wishes.

The bungalows are handled "over the counter," as is the furniture that is sold on partial payment. The purchaser pays so much down—$2000 on these houses—and there is a mortgage taken for the balance with stated monthly payments. The owner pays all taxes and assessments as well as insurance, the latter standing in the name of the store until the house is clear.—*The New York Times.*

Douglas Fir Used in China

ACCORDING to a recent economic survey by the Commission on Commerce and Marine of the American Bankers' Association, Douglas fir is the most important kind of lumber sold by the United States to China. While it is the standard construction lumber, and is used in larger quantities than any other species, lumber from Singapore is also used in considerable quantities in construction work. Philippine woods (lauan, almon and apitong) are also coming into use in China, being used largely for interior work and to some extent for furniture.

One-half of this old frame double house in Northampton, Massachusetts, has been the home of Mr. and Mrs. Calvin Coolidge and the Coolidge boys since the beginning of Mr. Coolidge's political career. This photograph was taken during a demonstration by their proud neighbors in honor of Mr. Coolidge's election to the office of Vice-President. The new President and his family can be seen standing on the steps leading up to the porch on the Coolidge half of the house

President Coolidge has just moved into his new home, the White House, as this issue is printed. This famous home of the Presidents was built in 1792 from designs by an Irishman, James Hoban, who superintended the erection and also its restoration after it was burned by the British in 1814. The White House was first occupied by President and Mrs. John Adams in November, 1800. It was first lighted by gas in 1848 and in 1853 a system of heating and ventilating was installed

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Six men's pay

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NAMES	Rate per Day	AMOUNT Dolls.	Cts.
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C. Novak	8.00	8	00
A. Moran	8.00	8	00
F. Malloy	8.00	8	00
G. Clark	8.00	8	00
R. Duncan	8.00	8	00
		48	00

TIME BOOK

NAMES	Rate per Day	AMOUNT Dolls.	Cts.
J. Morris	6.40	6	40
Operating Expenses:			
Garnet paper			60
Electric power		1	00
		8	00

The "American Universal" floor surfacing machine will replace six hand scrapers on your payroll! Where hand scraping costs you $48.00, your floors can be surfaced the "American Universal Way" for $8.00—an actual increase in your floor surfacing profits of 500 per cent! The "American Universal Way" is not only the CHEAPEST WAY—it is the BEST WAY. Makes a beautiful, smooth surface free from chatter marks, etc. A very good job at a very low cost!

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For the Builders' Library

"Mechanical Testing," by R. G. Batson and J. H. Hyde, is the second of two volumes treating with methods and apparatus used for the testing of prime movers, machines and structures. It is a book for engineers and for those interested in scientific investigation and treats with such subject matter as dynamometers, gear tests, spring tests, the testing of lubricants, vibration tests, tests on concrete slabs and columns and various other information. The chapters on dynamometers are quite extensive and well illustrated, and contain some good information on the subject. Of interest to the building profession are the chapters on reinforced concrete slabs and columns. They contain photographs showing actual tests, descriptions of testing apparatus, and much information regarding the results of investigation by several different experimenters. Many design formulas are developed. The book is 5⅜x8¾ and contains 446 pages. It is published in New York City by E. P. Dutton & Co., 681 Fifth avenue. Price $10.

"The Cathedral Church of England," by William Burnet Tuthill, M. A., architect. An intimate study of the English cathedral church structures as a developing system of beautiful expression of architectural art, together with a more or less critical examination of the supremely important buildings belonging to it... 194 pages with 78 illustrations; size 6x9; price $2.50; The Macmillan Co., New York, publishers.

"Concrete in Home Sanitation"—There is no subject of greater importance to the home owner, or for that matter to the nation, than that of home sanitation. His own and his family's health and welfare depend upon the most efficient disposal of wastes, the protection of water supply and the exclusion of rats and mice from the home. As part of its service to home owners and contractors and builders, the Portland Cement Association has published a new booklet "Concrete in Home Sanitation" which contains under one cover the subject matter of several separate booklets issued in the past, together with newly prepared material. In its present convenient form this booklet contains information which the builder, particularly in rural communities can hardly afford to do without. The booklet is 6x9 in size and contains 16 pages.

"A Practical Course in Roof Framing" is the title of a 264-page book on this subject by Richard M. Van Gaasbeek, head of the department of woodworking of the School of Science and Technology, Pratt Institute, Brooklyn, New York. This book is now in its second edition and has been revised and enlarged to cover more ground than Mr. Van Gaasbeek's first book of the same title. The text is intended to afford practical instruction for foremen, journeymen and apprentices wishing to qualify for advanced positions or to become builders. All of the problems and drawings illustrated were developed in the carpenter's shop of Pratt Institute. They are intended to represent typical everyday jobs and to offer a variety of simple and complicated roofs for practical purposes. The book opens with a chapter on the fundamental principles of roof framing, giving an explanation of terms and a complete and concise discussion of the adjustable fence. The problems range from how to frame a gable roof to an advanced problem in framing an unequal pitch roof with dormers. Tables of runs and lengths are given for the rafters in nearly all problems. Gambrel roofs, curved rafter roofs, conic roofs and hopper bevels are also treated and one chapter is devoted to the determination of lengths of rafters and another to the method of mitering rake and level moldings. The book is well illustrated with diagrams and actual photographs of models built according to the problems described. On the whole, it contains real information for the man interested in gaining knowledge of roof framing. The book is 5x7½ inches in size and is bound in green cloth. Frederick J. Drake and Company, of Chicago, are the publishers. The price is $1.50.

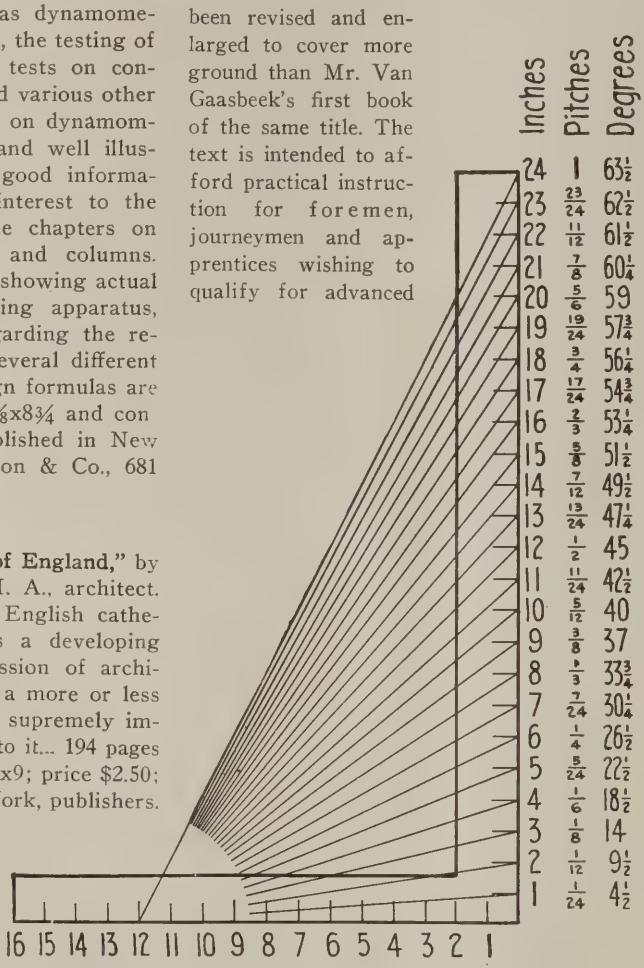
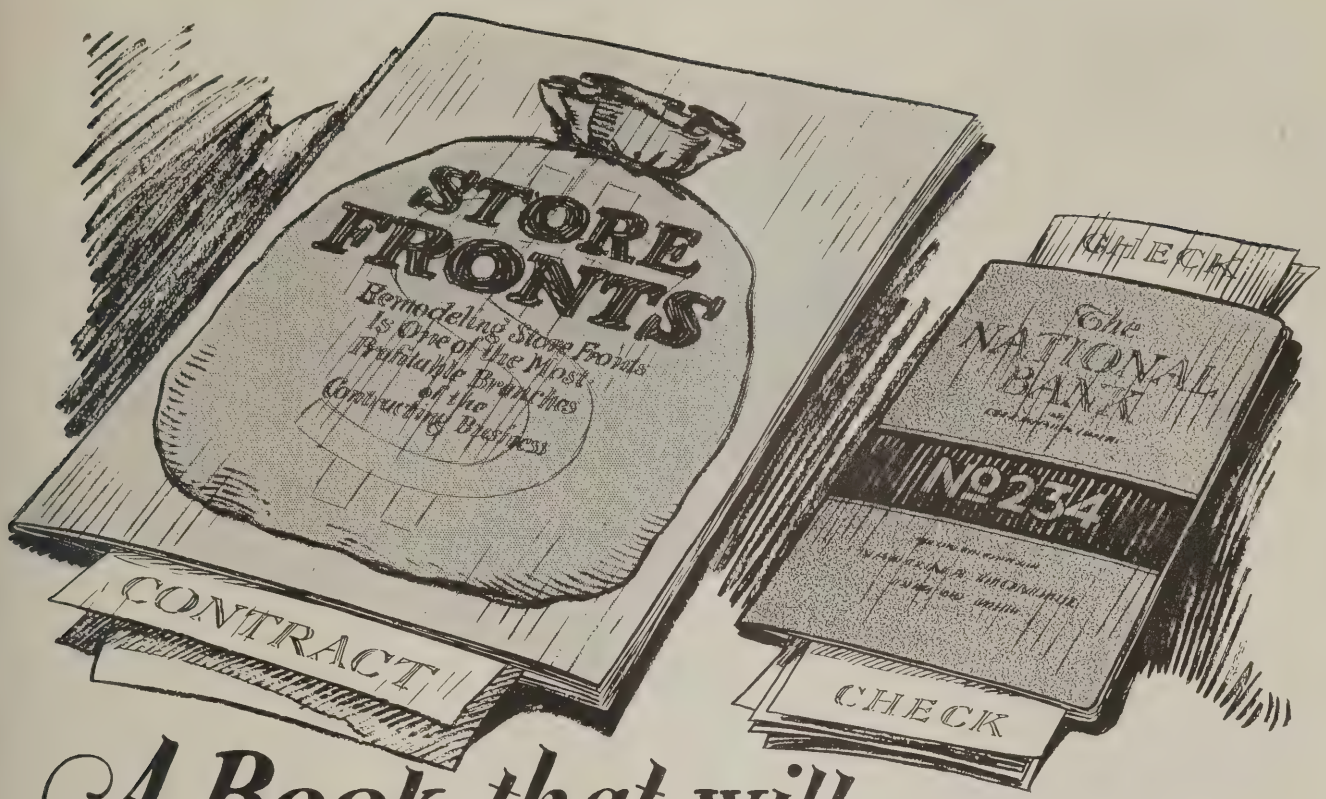


Diagram of roof pitches and degrees from "A Practical Course in Roof Framing"

"Structural Members and Connections" is the second of the Hool and Kinne series of reference works for engineers and engineering students. It is, however, a unit in itself and no reference is made to the first or to any of the succeeding volumes. The book contains 611 pages treating with both timber and steel construction and like the first volume of the series, is the work of several experts. The general theory of structures is covered in the first chapter to provide a review for those who may be out of touch with the subject. Design of steel, cast-iron and wood members as well as splices for steel and wood are treated, and quite a bit of space is given to the design of reinforced concrete members. The book is well illustrated with photographs and diagrams and also contains several useful tables. It is 6x9¼ and contains 611 pages; the price is $6 and it is published by the McGraw-Hill Book Co., 370 Seventh avenue, New York City.

"Concrete Data for Engineers and Architects"—The researches of the Structural Materials Research Laboratory at Lewis Institute, Chicago, have developed many previously unknown principles regarding concrete making. These principles, since verified by thousands of tests, are explained in the bulletins of the laboratory. To make the information contained in these bulletins more readily available to the busy engineer, architect and designer, the Portland Cement Association, 111 West Washington street, Chicago, has now published a booklet, "Concrete Data for Engineers and Architects," which contains the laboratory principles in brief form. Though abbreviated from the original reports, the principles are fully explained by both text and illustration. The booklet is 8½x11 in size and contains 16 pages.



A Book that will add to your bank account

All merchants who expect to prosper are being forced by competition into the use of attractive modern Store Fronts. Are you getting your share of these new installations?

This Store Front book tells the contractor how to locate prospects and secure profitable contracts. It tells how to handle such contracts quickly, efficiently and profitably. It tells how to get business regardless of competition by offering the proper style of Front and correct materials.

Desco Store Front installation can be handled by any contractor with his regular employees because of the simplicity of the construction. The construction reaches the job ready for immediate installation. All parts fit accurately. Drainage, ventilation and protection of the glass from vibration are provided for in the construction.

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In many cities Desco is stocked by distributors who can fill orders immediately. Ask for the name of the distributor nearest you. See Sweet's catalog for Desco details.

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Without obligation on my part send me a copy of your book on Desco Store Fronts.

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Among the Manufacturers

New Devices Methods and Improvements in the Building Industry

Portable Conveyor Loads Truck

ONE man can load a two-ton truck with bituminous coal in five minutes allowing ample time for backing and shifting of the truck, with the portable conveyor with overhead construction manufactured by the Link-Belt Company, Nicetown, Philadelphia, Pennsylvania, according to the manufacturers. It is said that once in place the conveyor-loader can handle a ton a minute with uniform feed.

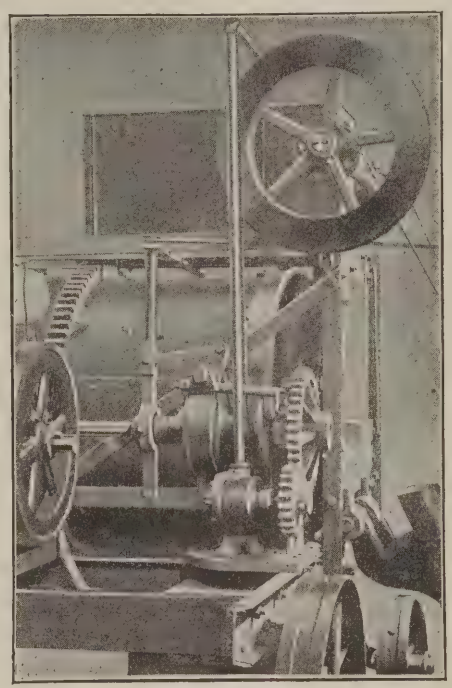
Link-Belt portable conveyor with overhead construction handling bituminous coal

This is the equivalent, it is pointed out, to the work of four men for thirty minutes. At $5 a day the economy in labor costs would total a sizeable sum during the course of a month. This saving, coupled with the saving of 25 minutes per load in truck time (which earns money only while busy and which usually costs from $16 to $20 a day) soon justifies the $585 investment and the small amount of electricity required to operate the two-horsepower motor.

Contractors, builders and dealers handling sand and gravel in quantities will find this conveyor as useful as does the coal dealer.

Hoist Attachment for Concrete Mixer

CONCRETE mixers with hoisting attachments can be used in many cases such as silos, small buildings, barns, etc., where it would not be practical to move



Hoisting attachment for a concrete mixer

and set up a separate hoist and engine, or invest the amount required for such an outfit. This makes an excellent outfit for masons and building contractors.

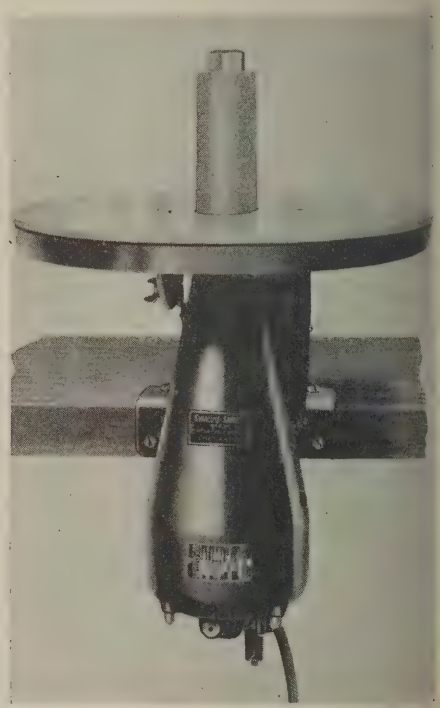
A heavy steel channel extends across the bottom of the mixer frame, and is bent upward to provide a base for the outward bearing. This gives strength to the attachment. The countershaft is 24 inches longer than on the standard machines. On this shaft is mounted the winding spool, friction clutch, brake and outboard bearing.

It is very simple in operation. One lever operates both the clutch and the brake. When the lever is pushed toward the mixer, it engages the clutch, which winds the spool and hoists the load. To apply the brake, the lever is pulled in the opposite direction. The brake is very powerful, being lined with Raybestos, and controlled by two machine screws—a slight turn of which, clamps the brake securely around the outer part of the winding spool. As this brake is self-locking, it will hold the load anywhere without attention when once applied.

The illustration is of the Republic "Ten" mixer, manufactured by the Republic Iron Works, Tecumseh, Michigan.

Oscillating Spindle Sander

THE oscillating spindle sander here illustrated has just been put on the market by the Porter-Cable Machine Company of Syracuse, New York, for the



This oscillating spindle sander can be attached to a bench or placed on a pedestal if desired

pattern shop or woodworking factory that feels they have not enough internal or irregular work to warrant buying the larger machine heretofore offered. This machine is equipped with a G. E. motor, which has a speed of 1725 r.p.m. and is totally enclosed. The motor is connected direct through the spindle which has an oscillating movement of 1 inch, is equipped with ball bearings and furnished with a 2¼x6-inch roll. The table of this machine is ground, tilts 45 degrees down and 15 degrees up and is 16 inches in diameter. The weight of the machine is 75 pounds and overall dimensions are 16x16x25 inches. The machine can also be placed on a pedestal if desired.

Why is the Cover Thick?

Because it must resist wear. No other book gets the rough treatment that a ledger receives. Hence its covers are thicker than on any other book.

This fact is so obvious that it seems like a waste of time to mention it.

But sometimes the fact is overlooked that a shingle, like a ledger cover, also receives hard wear. A builder who would not think of using a paper covered ledger in his office has no hesitancy in putting paper-like shingles on the houses that he builds.

That is a mistake. The builder who is careful of his reputation recommends durable roofing for his buildings.

If he is wise, he will suggest Winthrop Tapered Asphalt Shingles. They are thickest where the wear is hardest—at the butt.

The big butts which are exposed to the weather of Winthrop Tapered Asphalt Shingles are built up of everlasting asphalt until they are about twice as thick as common asphalt shingles.

They add tremendously to the wearing power of a roof but little to its weight or cost. The shingles never curl or flutter in the wind, but lie flat and stay put.

Varying shades of tile red, sea-green, and blue-black offer a selection for any color scheme or to suit any taste. Use them in solid colors or in combinations to produce mottled effects.

Because of their thick butts, Winthrop Tapered Asphalt Shingles give "texture" to a roof that cannot be obtained with flat shingles. They produce shadows that bring out desirable architectural effects admired by home owners.

For large house or small, new home or old, for applying originally or over old shingles, Winthrops fill the bill. Their price is remarkably low for their quality and the service that they give.

Send for free samples and descriptive literature. They are free

BECKMAN-DAWSON ROOFING COMPANY

14203 Monnier Road, Detroit, Mich. **830 F. C. Austin Building, Chicago**

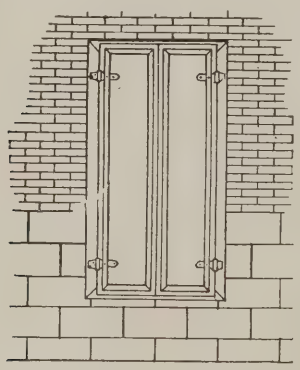
Thin at the Top Thick at the Butt

Spiral Fire Escape the Thing for Schools

ACCORDING to the National Fire Protection Association, a fire escape should permit the exit of 46 persons per minute. The Dow Company, Louisville, Kentucky, manufacture a spiral slide fire escape which has a capacity of 150 persons a minute, and at the same time there is

A spiral slide fire escape as installed outside of the building

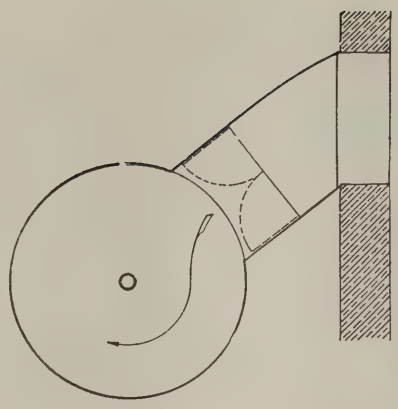
no chance of anyone stumbling or falling, for the user sits down and slides. His own weight takes him down on a smooth spiral slide and delivers him, feet first and upright on the ground. The slope of the slide is such as to throw the body toward



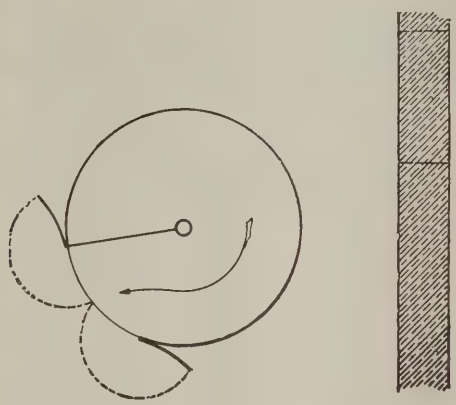
Exit from escape placed within the walls of the building

the inside of the tube, which means that other people can enter at each floor advantageously without any interference, and because of the excess capacity of the escape, it is "just the same as stepping out of a doorway and walking with the crowd; there is always room."

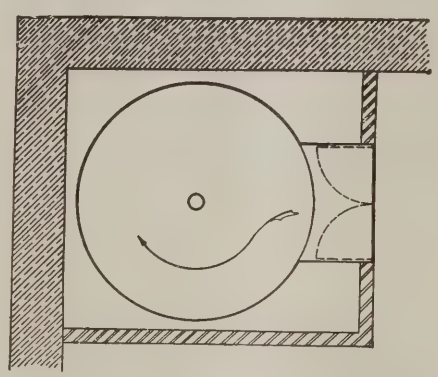
The Dow spiral slide fire escape, the company points out, is made entirely of steel. It consists of a smooth galvanized spiral slide enclosed in a cylinder five feet in diameter, equipped with automatic entrance and exit doors. It rests on its own foundation and does not depend on the building walls for support. It may be erected either on the exterior of the building or incorporated within the walls of the building. The diagrams show the entrances and exits of both installations.



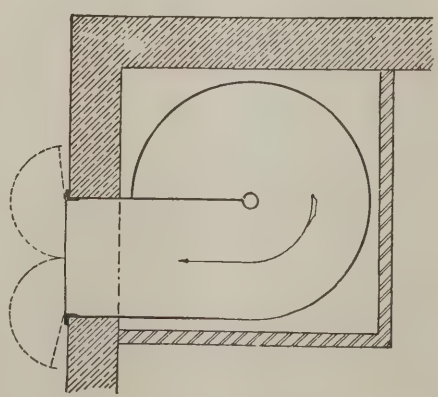
Entrance to escape on outside of building



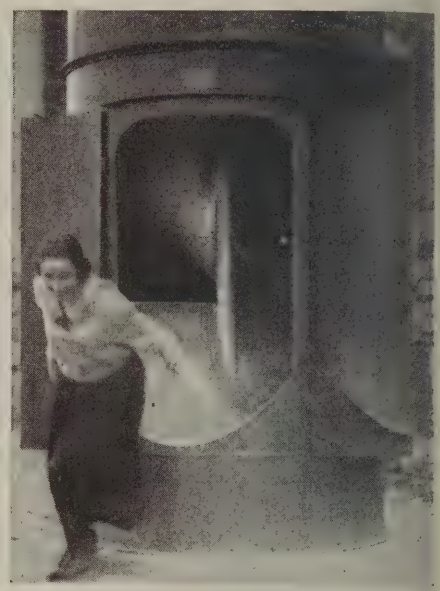
Exit from escape placed outside of building



Entrance to escape placed within the walls of the building



Exit from escape placed within the walls of the building



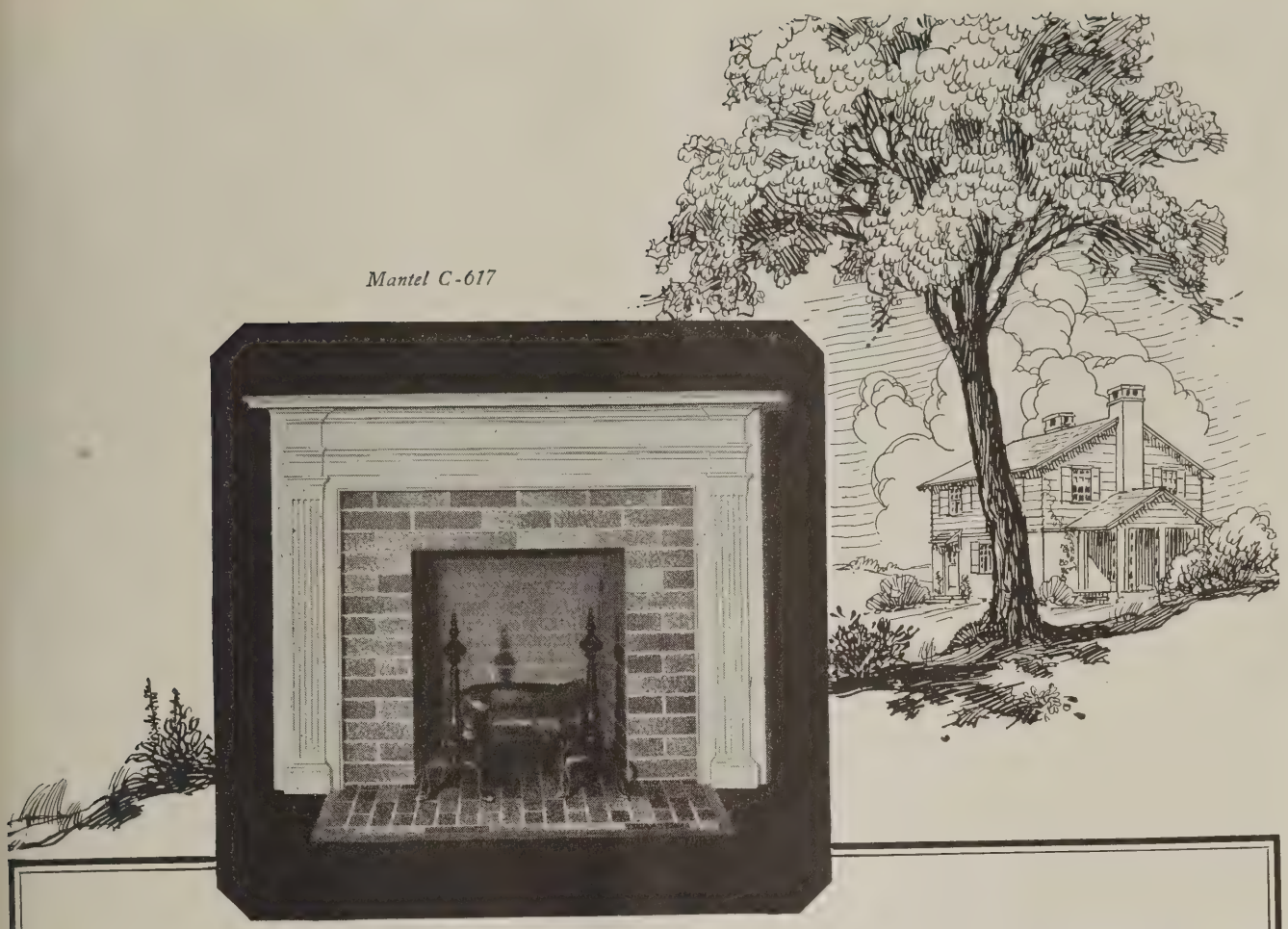
The slide delivers the user feet first and upright on the ground

Portfolio of Plans for Single Homes

USERS of the portfolio of two-family houses, published by Henry W. Grieme, architect, Engineers Building, Cleveland, Ohio, will be interested in his latest publication, a portfolio of plans for modern single or individual houses. Like the other work, this one is in portfolio form and is 11x14 inches in size. The floor plans are drawn to ⅛-inch scale and two elevations are shown for each house. Essential dimensions are indicated in every case. The price of the portfolio is $2.50.

Brixment for Perfect Mortar

"BRIXMENT is a cement for brick mortar. It is made of argillaceous limestone, unsaponified oil (or waxy material) and oily shale by an exclusive process patented in the United States and foreign countries." Thus begins the attractive 16-page booklet of the Louisville Cement Company, Incorporated, Louisville, Kentucky, which they have issued to increase knowledge of their product among contractors, architects and builders. Because of the facts and information it contains about a useful material, the book deserves a place in every builder's library. It is sent without charge upon request.



Mantel C-617

Price Is a Poor Thing to Judge by When You Buy Woodwork

What you buy is simply a tree cut up into lumber and assembled to make a design.

The tree itself could be had quite cheaply.

Price is not what you are looking for. No, you buy ready-made woodwork to avoid doing the work of assembling it. The more nearly finished it is, the more it is worth to you.

This has been the sane way Curtis always looked at the matter.

Accordingly, Curtis Woodwork is always sold as complete as possible—never skimped and left unfinished to meet a price.

The designs are by famous architects. Elaborate machinery turns out Curtis Woodwork in wholesale quantities. The wood is selected according to the task it has to perform. Finishing touches are given by machinery that would be prohibitive if done by hand.

As a result, the price of Curtis Standardized Woodwork is low. It is hard to equal the quality at any cost.

Satisfied customers result from the use of Curtis Woodwork. The job goes up more smoothly. The sale of the house is made easier by the use of this nationally known woodwork. Each piece is stamped with the trademark—**"1866 Curtis."**

The makers of Curtis Woodwork guarantee complete satisfaction to its users. "We're not satisfied unless you are." Every month in the year the Curtis story is told to millions of readers in such magazines as: The Saturday Evening Post, Ladies Home Journal, American, House and Garden, House Beautiful, and Country Gentleman. Also in Sweet's Catalog.

We invite you to write for our free booklet, showing the Curtis line of permanent furniture.

The Curtis Companies Service Bureau, 79 Curtis Building, Clinton, Iowa

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CURTIS WOODWORK

A floor of rubber tile in the entrance lobby of an apartment building

Rubber tile are easy on the kitchen worker's feet and easy to keep clean

Rubber Tile for Floors

WHEN a rapidly increasing percentage of the population is moving about on rubber, either in the form of tires or rubber heels and soles, is it not about time that the wearing qualities, softness, resilience, noiselessness and fine appearance of this serviceable material be taken advantage of as a flooring material? The Wright Rubber Products Company, Racine, Wisconsin, think so and as a result have installed extensive facilities for the manufacture of Wright rubber tile for floors and stair treads.

This tile is a composition of rubber and other wear-resisting materials, specially prepared by a patented process, to meet the requirements of an all-'round flooring material for factories, banks, churches, offices, libraries, hospitals, hotel and apartment corridors, schools, theatres, restaurants, etc., as well as for use in residences in sun porches, kitchens, bathrooms, pantries, billiard rooms, etc.

The Wright rubber tile are without grain, and so will not splinter; they are not hard or brittle, so will not crumple or dust; and they are not susceptible to ordinary temperature changes, hence will not curl or warp. The tile are equipped with patented interlapping flaps provided with countersunk holes which make it possible both to nail and cement the tile to wood, cinder, concrete or any nailable surface. This flooring is adaptable for use with concrete, marble and terrazzo borders, and forms are produced for use on stairways. The joints are close and sealed with an insoluble cement, leaving no pores or seams. The rubber is non-odorous at all times.

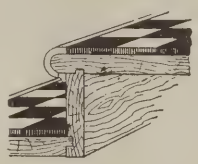

Fig. 1

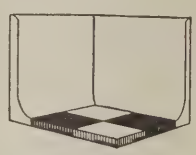

Fig. 2

Rubber tile as used on stairs and with all styles of bases

Fig. 3

Fig. 4

Interlapping flaps with countersunk holes for nailing to wood or cinder concrete floors

Some attractive effects can be gained with Wright rubber tile, for they are furnished in a wide variety of colors and in plain, mottled or grained effects. The manufacturers claim that the colors are permanent because they permeate the entire thickness of the tile, and will therefore remain as distinct and fresh after years of service as when first laid.

Tile are furnished in standard units 4x4, 6x6, 12x12, 12x18, and 18x18 inches; and also in strips 12 inches long and any width. They are supplied in two thicknesses, ¼-inch and 3/16-inch, and in two grades, select and standard.

The cost of this flooring varies with market conditions, labor charges, transportation costs and other factors but the producers point out, it is not expensive when its long life and its distinctive features are considered.

The office floored with rubber tile is quiet and pleasant to work in

Rubber tile floors in stores withstand hard usage and because of their attractive appearance invite customers

RICHARDSON Product

From the makers of Flex-a-tile Housetops, Viskalt Membrane Roofs, Viskote, Wall Board, and similar products

The Super-Giant Shingle—50% thicker, 100% more rigid, and 35% more economical in cost of laying

Achieved! True distinction in a shingle 50% *thicker;* 100% *stiffer;* *with absolutely exclusive color effects*

In addition to weather protection, beauty in roofing is coming to be more and more important. To meet this demand, a new slate-surfaced shingle has been created—one of outstanding distinction in its combined serviceability and beauty.

This unique product is the Richardson Super-Giant Shingle. During the comparatively short time it has been on the market, hundreds of homeowners and builders have written us about it, and its sales have increased remarkably.

You can easily see why, when you compare it with ordinary shingles—for instance, as to serviceability.

Its greater size (10″ x 14″) saves 35% in cost of laying. Its 50% greater thickness makes it last much longer and casts a deeper shadow line on the roof. And its 100% greater stiffness keeps it rigid in all kinds of weather and makes the whole roof twice as firm.

Moreover, its inner materials, felt and asphalt, give conclusive evidence of its endurance. Richardson felt, as you know, has for the last fifty years been recognized as the best. And the asphalt which goes into it is of the highest grade raw materials refined exclusively by the Richardson process.

Beauty hitherto unknown

On this super-shingle alone is used a color in slate hitherto unknown—a rich *weathered brown* found only in the Richardson quarries of Georgia.

It is as beautiful as the russet of November fields, and with use, it mellows and deepens to a shade like the thatch of an English cottage.

Architects are enthusiastic over its rare color effects, especially when it is blended with other Richardson shingles of jade green, tile red, or black pearl.

These facts will sell it

A super-shingle, indeed, when you weigh its points one by one! First—unusual dimensions which give added life to the roof at ⅓ less in cost of laying. Second—exceptionally high test standards in its materials. And finally—absolutely exclusive color effects.

These definite talking points will appeal to your customers—especially the exclusive color effects. And, of course, Richardson Super-Giants are equally good for new or "over the old roof" jobs.

Send for our beautiful new color chart, together with samples of Richardson Super-Giant Shingles in *weathered brown* and other colors. For every roofing use there is a Richardson product—from Lok-Top Asphalt Shingles to Rubbertex Roll Roofing with Pyramid Kaps. Just use the coupon below.

The RICHARDSON COMPANY
Lockland (Cincinnati) Ohio
Melrose Park (Chicago) Ill. New Orleans, La.

RICHARDSON ROOFING

Clip and mail this coupon

THE RICHARDSON COMPANY
Dept. 33-I, Lockland, Ohio
Gentlemen:
Please send me samples of Richardson Super-Giant Shingles, your new color chart, and further facts about Richardson Roofing.

Name .....

Address .....

© 1923, The Richardson Company

The stucco or plaster passes between, around and behind the slender ribs of "expanded" wood lath and interlocks with them

"Expand" Wood to Make Lath

A PROCESS perfected several years ago and described in NATIONAL BUILDER at that time whereby wood can be "expanded" and lath of unusual qualities made of it, is now being utilized by the Expanded Wood Lath Corporation, Conway Building, Chicago, Illinois. A strip of wood of ordinary lath thickness and 8 inches wide is cut by a special machine with diagonal slits and parallel grooves; it then goes through another machine which cuts a series of grooves under and in line with the diagonal slits. Each groove is half as deep as the stock is thick and about ¼-inch wide. Steel fingers underneath the machine table engage the grooves one at a time and "expand" the entire strip until it is twice its original thickness. The board is held in its expanded condition by single strands of wire stapled at regular intervals. The final operation is the application of a backing for the expanded wood lath consisting of a building paper secured to the wood by a preparation of hot pitch.

Expanded wood lath, or "Ex-Wo" as it is trade-marked, is made in one thickness, 5/16 of an inch. The strips are 16 inches wide and 4 feet long, to suit wall studding or furring strips that are spaced 16 inches apart on center. The lath is shipped in bundles cross-cleated and wired, and containing 15 sheets each.

Because the connecting ribs or diagonal strips are half the width and thickness of the parallel strips which they connect, the stucco or plaster passes between, around and behind the slender ribs and interlocks.

Papering or furring is unnecessary for plastering or sheathing for stuccoing. The manufacturers claim it saves 35 per cent of the first cost of plaster. The wood used is sound yellow pine free from knots or other serious defects.

Ex-Wo lath is the invention of a contractor in Los Angeles, but it was first made in Chicago in 1918, and today is produced at the rate of 3000 square yards daily, in the yellow pine district around Tuscaloosa, Alabama, by the Expanded Wood Lath Corporation.

New Device Operates Both Sash at Once

HENRY C. TROST, of Trost and Trost, architects and engineers, El Paso, Texas, has patented a device for automatically operating the top sash of a double-hung window by means of the lower sash. It is shown in place in Fig. 1.

Fig. 2 shows the lower sash being raised until the pendulum on the bottom fixture on meeting rail of lower sash strikes the lower beveled surface of the upper fixture on side rail of upper sash thereby engaging the device on upper sash, then by lowering the bottom sash the top sash will lower with it any desired distance as in Fig. 3.

To disengage the lower sash, it is raised until the pendulum swings entirely over the fixture on the upper sash and the bottom sash is lowered any distance as shown in Fig. 4.

To raise the upper sash from the position it is shown in Figs. 3 and 4 the bottom sash is lowered until the pendulum swings entirely over the fixture on the upper sash, then lowered slightly until the pendulum engages the notch at the top of the upper fixture. The bottom sash is then lowered automatically, raising the upper sash, and the bottom sash brought down to the position shown in Figs. 1 and 4.

This device was originally intended for use in schools where the top sash is above the reach of the ordinary person and it does away with the old-fashioned pole and socket and their many inconveniences.

Fig. 1 *Fig. 2* *Fig. 3* *Fig. 4*
New device for automatically operating the upper sash by means of the lower sash

Ambler Asbestos

Saves in Labor and Replacement

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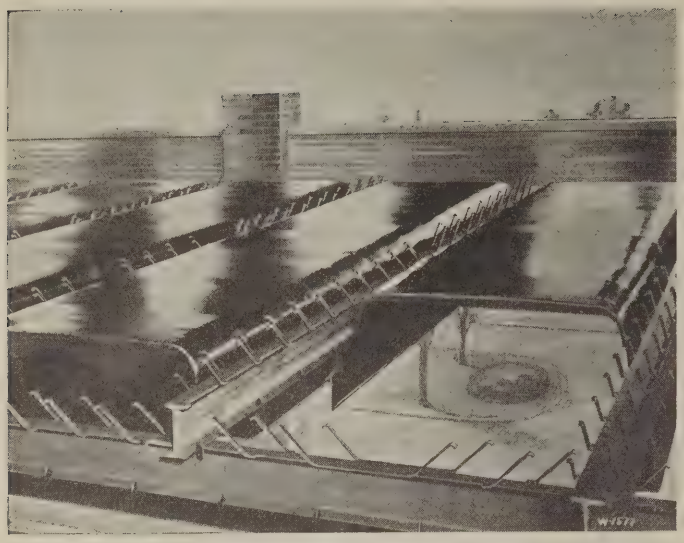

I-beams with top flanges sheared to extend into the concrete above to make a unit of reinforced concrete slab and beam

"Craftex," a permanent finish for wallboarded surfaces that covers cracks and obviates the use of battens

"Truscon-I" Construction

THIS construction consists of a series of I-beams with the top flange sheared to form rigidly connected diagonals extending into the concrete above. The I's are thus integral with the concrete, making a unit of beam and reinforced concrete slab. A complete system of removable steel forms which are suspended from the I's is provided. The I's thus serve the double purpose of providing supports for the forms until the concrete is set and of rigid reinforcement for the completed reinforced concrete structure. The only centering is usually one upright support at the center of the span. This construction eliminates the necessity for a great deal of form lumber, and it is claimed that construction can be installed on two or three floors at one time, and that the cost is low as compared to that of structural steel and reinforced concrete. The system is described in pamphlets issued by the Truscon Steel Company, Youngstown, Ohio. They are sent free to contractors, architects, builders and engineers.

Finish for Wallboarded Surfaces

HOW to finish wallboarded surfaces without the use of battens is a perplexing problem for many builders and decorators and stands in the way of their using wallboard in many instances where that low cost wall covering ought to be used. "Craftex," described as a permanent wall finish by the manufacturers, Simmons, Gardner Company, 146 Summer Street, Boston, is recommended as a complete solution to the problem of wallboard decorating. Joints in wallboard surfaces, after they are fitted in the usual way, can be so completely concealed by "Craftex," it is claimed, as to produce the effect of a plastered wall. This finish is to be used only on such wallboards as "Bestwall," "Sheetrock," etc., or asbestos boards such as "Linabestos" and the wood core board "Compo-Board , or other types og boards that do not expand or contact. It can also be applied to tin, wood and even glass surfaces, and it is claimed to be elastic and will not chip or peel off nor burn or crumble under extreme heat. "Craftex" is applied with a brush and it possesses an interesting relief which conceals defects in plaster or other irregularities of surface. One coat, averaging one-sixteenth inch thick, is said to cost less than three coats of paint or an average priced wall paper. It hardens over night.

Marks System of Gypsum Roofs

GYPSUM roofs, because of their light weight and insulation value, are considered ideal for many purposes by many contractors, engineers, architects and manufacturers. A method of constructing a monolithic, poured-in-place slab, eliminating drip during erection and the necessity of building temporary forms and their supports in which to contain the aggregate, is illustrated and described in an attractive booklet of 16 pages and 8½x11 in size, issued by H. E. Marks Corporation, Empire Bldg. Pittsburgh, Pa., and called the "Marks System of Gypsum Roofs."

This is the Lehigh Portland Cement Co.'s newest plant—No. 16—about to be put into operation at Birmingham, Ala. It's another link in the chain of plants the company has stretched from coast to coast and with it a total annual production of 16,000,000 bbl. will be afforded. The other 15 plants are at New Castle, Fogelsville, West Coplay and Ormond, Pa.; Fordwick, Va.; Mitchell, Ind.; Oglesby, Ill.; Mason City, Iowa; Iola, Kans., and Metaline Falls, Wash.

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National Builder

Serving the Building Industry Since 1864

October 1923

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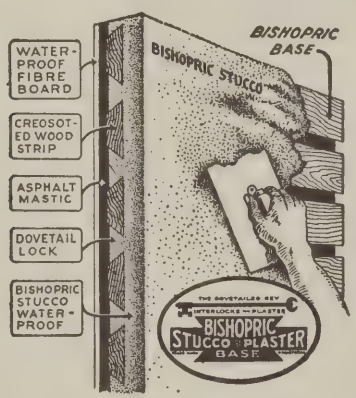

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National Builder

A Feast of Articles, as Well as Thanksgiving, for November

IN Michigan there is a builder who is doing something unique in the way of developing vacant property with attractive little bungalows of Spanish design, transplanted directly from Florida. You will be interested in knowing why and how he does it, and an article about the work of his organization will tell you in the November NATIONAL BUILDER. Probably his scheme can be worked in your town, too, and if you work it you may make more money than you now think is possible.

OUT in Kansas there is a Masonic Temple that many readers of NATIONAL BUILDER will be interested in, and so the November issue will bring you an article about it, generously illustrated with plans, details and photographs. You may have to build such a temple some day.

WITH land values soaring skyward these days, some means must be worked out for getting more floor space inside our houses. The two-inch solid plaster partition suggests a means. The next number will tell you all about these partitions.

BUILDERS in small towns and rural districts are very much interested these days in the Gothic roof barn. An article on the construction and framing of barns of this type in the November NATIONAL BUILDER will make that issue of particular value to this class of readers.

AND among dozens of other goods things coming next month will be an article about a very unusual movie theater built in a city where the movies are made. The accompanying photograph is but one of a number of this theater which NATIONAL BUILDER will reproduce for you in the November issue.

This is not a scene from the tomb of old King Tut, but from a modern movie theater. There will be an article about this theater in the November National Builder

ISN'T this a pretty good offering as a sampler for the November NATIONAL BUILDER? Yet, a sampler is all it is. Just wait and see if your November NATIONAL BUILDER isn't one of the best issues that you have received.

NATIONAL BUILDER is a journal for the contractor, architect and builder. It is published on the first of each month by the Tradepress Publishing Corporation, 542 South Dearborn Street, Chicago, Ill., to whom all communications concerning subscriptions, contributions or advertising should be addressed.

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Renewals: Instructions for renewal, discontinuance or change of address should be given three weeks preceding date of issue. Both old and new addresses should be given. Subscribers wishing to discontinue their subscriptions must notify the publisher upon dat of expiration.

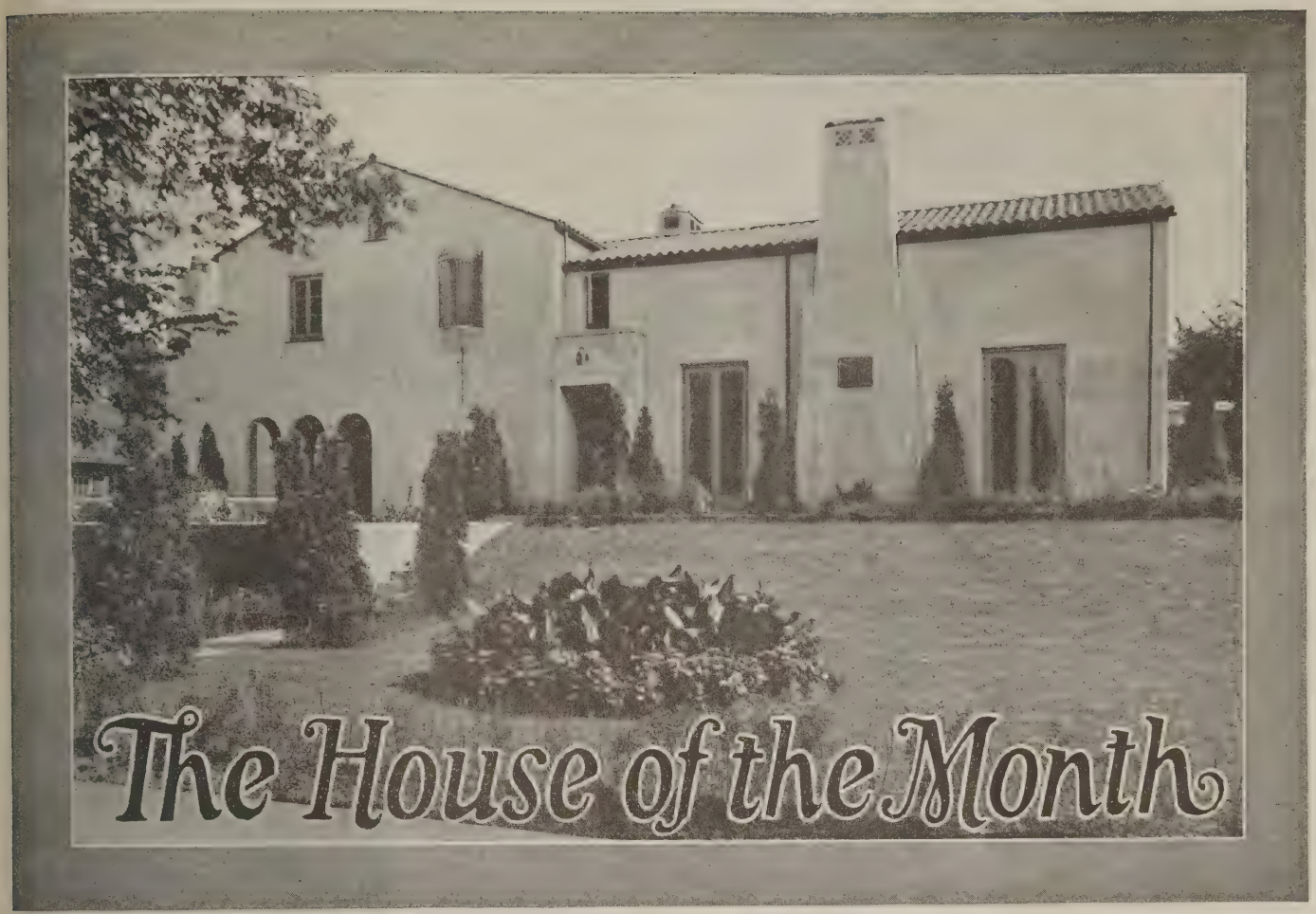
Contributions to the editorial pages will be accepted solely on their merits and paid for at the regular space rates. Contributions of timely nature must be in on the 15th of the month preceding date of issue.

Advertising: Space in the advertising pages is sold according to published rates, furnished on application. Copy must be in on the 15th of the month preceding date of issue if proofs are to be submitted for approval before publication. Last forms close on the 23rd of the month preceding date of issue. The publishers reserve the right to reject or revise any advertisement containing statements of doubtful authenticity or derogatory to any building material, accessory or equipment.

Mechanical Requirements: Type size of page, 7x10 in.; half-page, 3½x10 in. or 7x4⅞ in.; quarter-page, 3½x4⅞ in. or 7x2⅜ in.; eighth-page, 3½x2⅜ in. Screen required, 120 line; reversed plates must be stippled or Ben Day.

National Builder is a charter member of both the Audit Bureau of Circulations and The Associated Business Papers, Inc.

Concrete and stucco give proper expression to the house of the Spanish type of architecture, and a tile roof adds a touch of color



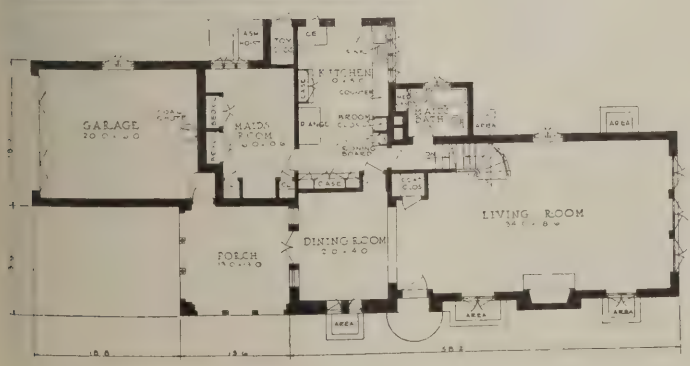
ONE of the most talked-of houses in Chicago at the present time is that recently completed for Mr. Victor Pearlman on the famous Sheridan Road, near Kenmore Avenue. Clark & Walcott were the architects and C. H. C. Neilsen and Son, general contractors.

The house is in the Spanish style, finished in a pink stucco. It is situated on a corner lot and is of very attractive appearance from all sides, as shown in the photographs.

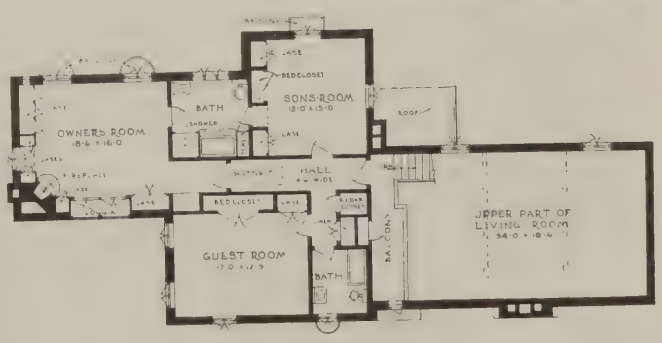
The plan is of unusual arrangement. The living room extends up two stories, with raftered ceiling, and the dining room floor is two steps below that of the living room. There is a downstairs room and bath for the maid, and the garage is incorporated as a part of the house itself.

Upstairs there are three bedrooms and two baths, one being between the two main bedrooms. An interesting detail of the second floor is the balcony off the upstairs hall, which overlooks the living room below.

The owner has richly furnished the house, as shown by the interior views on the next page, and the charming results that he has attained shows the many possibilities which a well-designed background in the shell of the house itself and its window and door openings, affords.



FIRST FLOOR PLAN



SECOND FLOOR PLAN

Inside The House of the Month

The living room extends through the second floor and has a raftered ceiling with the under faces of the wood joists painted in polychrome. A beautiful detail is the stairway to the balcony. It has a wrought-iron balustrade and handrail and a braided silk rope hangs in graceful curves along the wall. The balcony serves as a study, and the niches in the wall for open book shelves

The dining room is two steps down from the living room and is much smaller in size. The French doors lead to the porch

Built-in dressers and tile floor and walls make a very pleasant work place of the kitchen. The range is a combination gas and electric stove. A built-in ironing board, a broom closet, a refrigerator for outside icing, and a sink with long working counter beneath a row of casement sash complete the kitchen equipment

The other end of the living room contains three pairs of French doors, all with attractive iron grilles. The walls have a rough troweled finish. Note the interesting windows high up off the floor

A view of the owner's bedroom. A fireplace is in one corner of the room

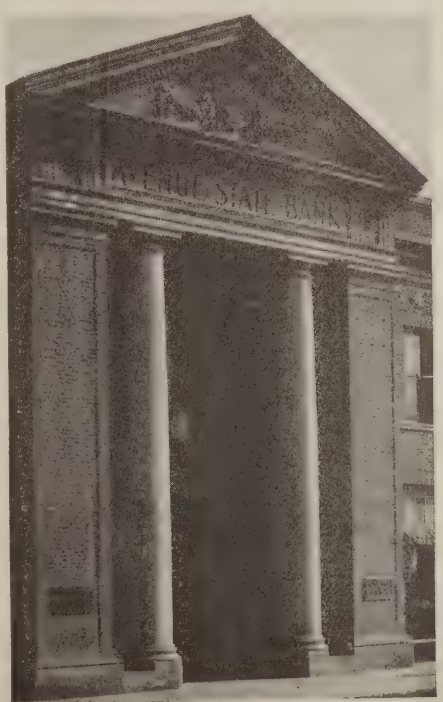
A combination bank, store and office building which presented some interesting problems in its design, plan and construction. Puckey & Jenkins, architects, Chicago

A Suburban Bank, Store and Office Building

It is an Important Business Center in Oak Park, Illinois, Attracting Patrons of the Bank, Stores and Professional Men Occupying the Upstairs Offices, to the Mutual Benefit of All

SOME difficult problems were solved in the design, plan and construction of the Avenue State Bank building in Oak Park, Illinois, which was erected in 1919 from plans drawn by Puckey & Jenkins, architects, of Chicago. Fred O. Rippel superintended the construction.

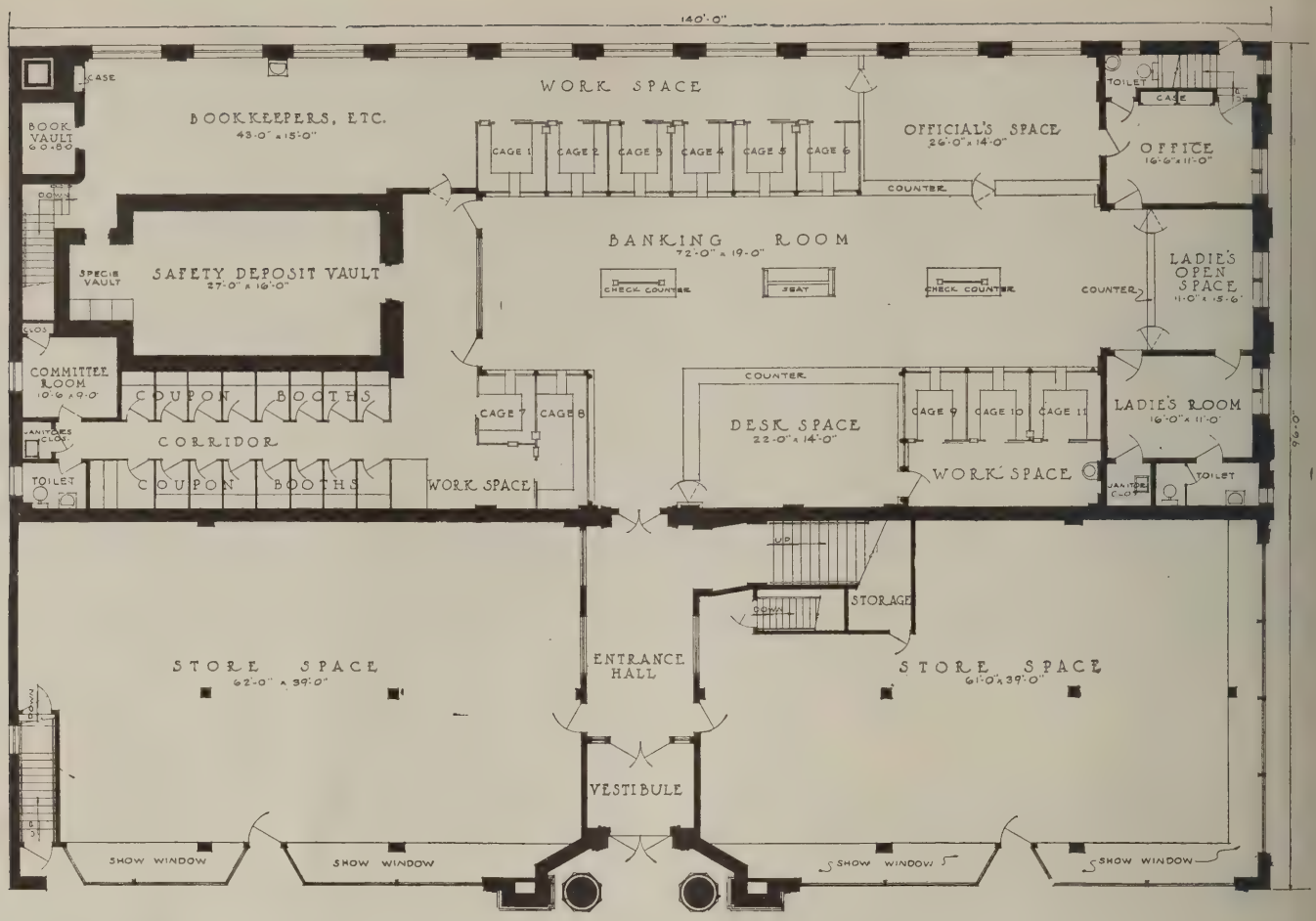
The building was constructed on the site of an old reservoir which was fed by fresh water springs and which formerly served the municipal water supply system. It was necessary to keep pumps constantly going during the erection of the building to keep the excavation clear of water and the basement dry, and in order to insure a dry basement in the completed building a complete spiderweb system of drain tile was laid as shown on the basement plans. This plan and the line section showing the approximate contour through the reservoir in relation to the building indicate the location and sizes of the columns and piers on which the building rests. A fire wall extends through the entire building, completely dividing all floors, including the basement, into two parts; the larger of which in every case is occupied by the bank and the other serves for stores and offices. This fire wall is so constructed that in the event the bank should require additional room, the wall can be broken through and the floor space now occupied by the stores and offices be made available to the bank.



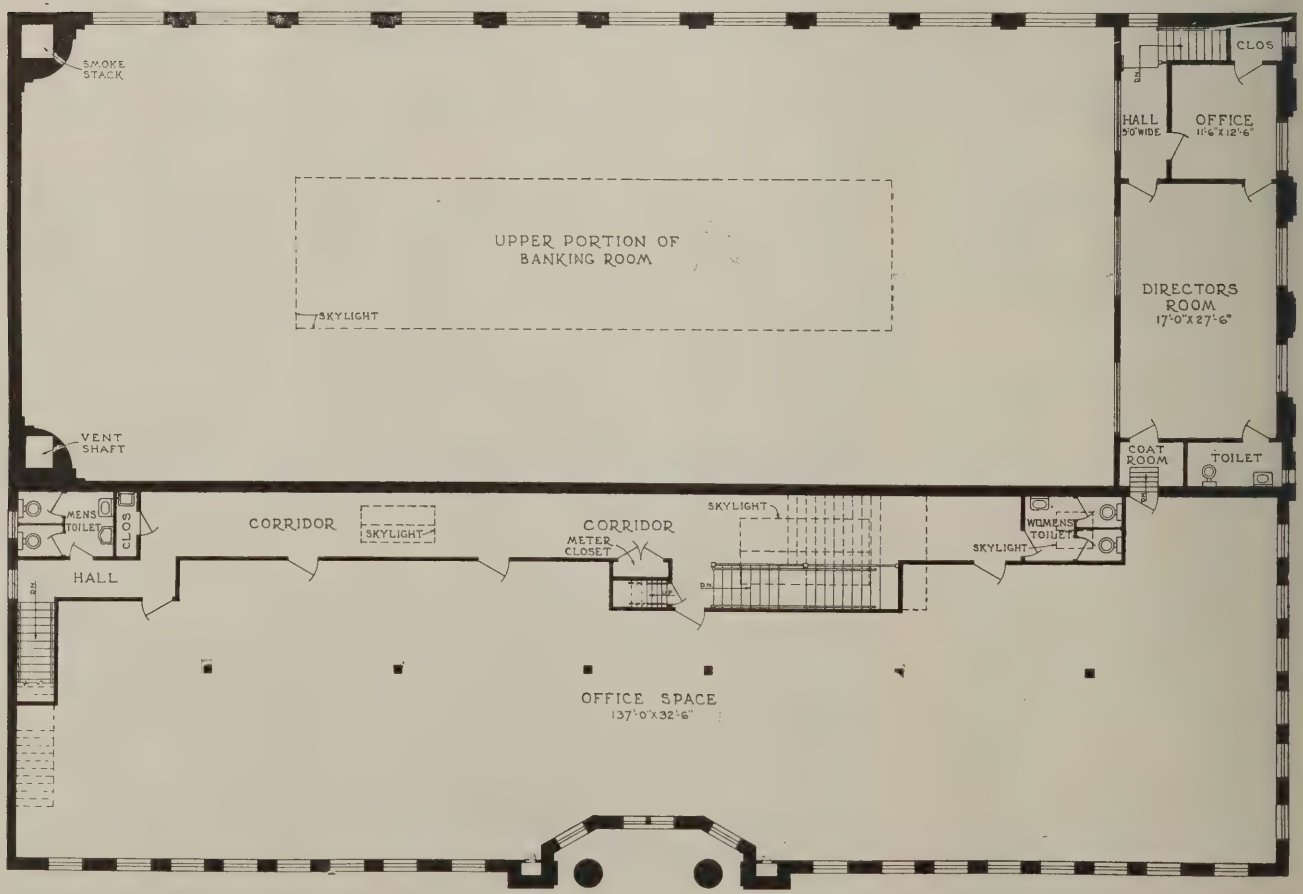
This treatment of the entrance distinctly identifies the building as a bank

The plan of the building is unique in many respects. The bank occupies the entire rear portion but it is entered directly from the street through a large doorway, vestibule and entrance hall, from which the adjacent stores are also accessible. This arrangement permits window display space for the stores while, at the same time, allowing prominent location of the banking quarters. The bank, situated in the rear of the building, attracts the patrons of the stores and of the professional men who occupy the office space on the second floor, which is accessible from a large stairway adjacent to the entrance to the bank. Similarly, the bank's customers are attracted by the stores which they must pass in order to reach the bank.

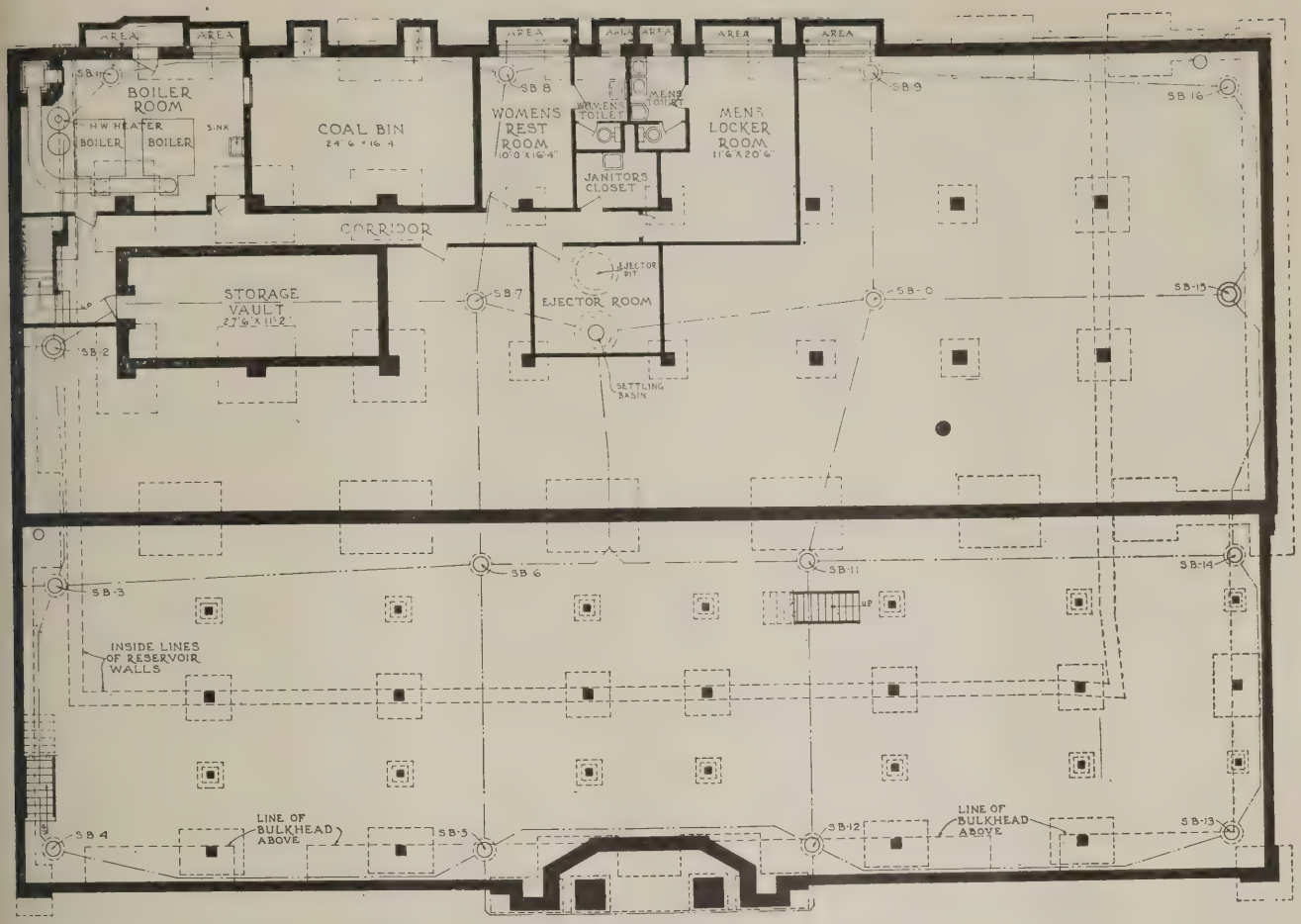
Glance again at the basement plan. The boiler room contains two boiler units with a 250-gallon hot water tank supplying hot water heat to all parts of the building. A special room is set aside for the ejector pumps



Plan of first floor. Note the wide entrance hall providing direct access to the bank



Plan of second floor. The office space is divided off to suit the tenants

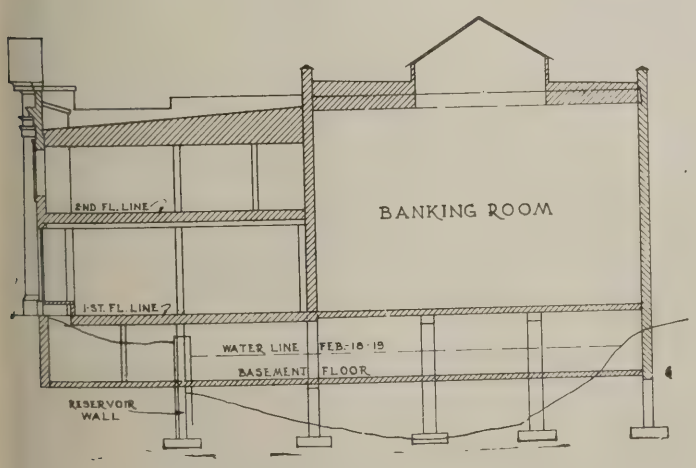


Basement plan. Note spiderweb system of drain tile

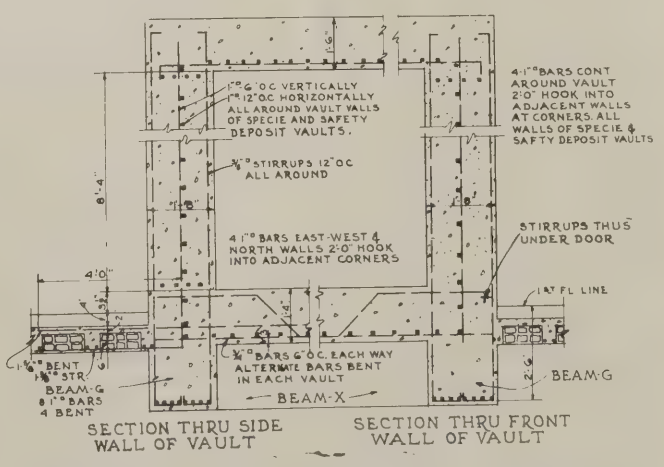
which keep the basement dry by means of automatic controls and it contains an air compressor which supplies the upstairs offices, largely occupied by physicians, with compressed air. The efficiency of the drainage system of this building was recently put to a severe test by two extraordinary rains which deluged this part of the country. They were about a week apart. After the first rain the basement was kept entirely dry but water somehow reached the main floor. Investigation proved that the traps in the drainage system which consist of simple back water valves had become clogged, allowing the backing up of water in the pipes. These valves were cleaned out and when the second deluge occurred both basement and main floor were kept as dry as in normal weather, in spite of the fact that many basements in nearby buildings suffered considerable damage.

Adjacent to the boiler room is the coal bin which will hold from 65 to 70 tons of coal and next to it are the women's rest rooms, the men's locker rooms and the toilets.

At the foot of the stairway and directly under the main floor vault is the storage vault where the bank keeps records, silver, stationery and sundry supplies. The rest of the basement is undivided space for general storage purposes. The basement beneath the stores is divided off according to



Line section showing approximate contour through the old spring fed reservoir in relation to the building. A spiderweb system of drain tile and automatic pumps keep the basement dry


4-1" BARS CONT AROUND VAULT 2'0" HOOK INTO ADJACENT WALLS AT CORNERS ALL WALLS OF SPECIE & SAFTY DEPOSIT VAULTS
1" G. O.C. VERTICALLY 1" 12" O.C. HORIZONTALLY ALL AROUND VAULT VALLS OF SPECIE AND SAFETY DEPOSIT VAULTS.
⅝" STIRRUPS 12" O.C. ALL AROUND
4-1" BARS EAST-WEST & NORTH WALLS 2'0" HOOK INTO ADJACENT CORNERS
STIRRUPS THUS UNDER DOOR
1ST FL LINE
⅝" BARS 6" O.C. EACH WAY ALTERNATE BARS BENT IN EACH VAULT
BEAM-G
BEAM-X
SECTION THRU SIDE WALL OF VAULT
SECTION THRU FRONT WALL OF VAULT

Detail of vault construction. The walls are 20 inches thick, of reinforced concrete, and steel armour plate is used to line the walls, floor and ceiling inside

the requirements of the tenants above.

Note the details of the construction of the vault in the main banking room. This vault contains 5000 safe deposit boxes. Its walls are of concrete, 20 inches thick and reinforced with 1-inch square bars placed on 3-inch centers both ways, and the walls, ceiling and floor of the vault are lined with ½-inch steel armour plate. A smaller vault at one end is for the storage of specie or money and it contains an emergency door through which anyone can crawl who might accidently be locked up in the main vault. The cages are carefully planned for the requirements of the bank and are conveniently situated with regards to the several departments of which they are parts. A double series of coupon booths is located near the safety deposit vault and back of them is a room entirely isolated for private conferences.

At the other end of the banking floor are the offices and the ladies' department including a ladies' room with toilet connected. Directly above on the second floor is a large directors' room with adjacent offices. These command a view of the entire main floor of the bank. The banking room extends clear through the second floor and has a skylight in the center ceiling. The second floor in the front half of the building is partitioned off to suit the individual requirements of the tenants. The long corridor is lighted by skylights and the men's and women's toilets are at the end. An abundance of windows on the two sides of the building provide a bright, well-ventilated office which attracts desirable tenants.

The banking room is finished in a restrained Italian style. The floors are of gray Tennessee marble, the base of the counter No. 3 Tinos marble; the dado Napoleon gray, and the counter tile and bull nose is verde antique. The wainscoting in the hall and vestibule is Napoleon gray marble. A unique feature of the banking room is its artificial lighting. No light fixtures are visible on the walls or ceiling. The indirect light thus produced by the unexposed lights is softly diffused, presenting a very attractive effect and supplying a light closely approximating that of day.

The directors' room on the second floor

A rolling shutter door above the opening between the entrance hall and the banking room automatically drops in case of fire and completely shuts off the two sections of the building, thus protecting either from any fire that starts in the other.

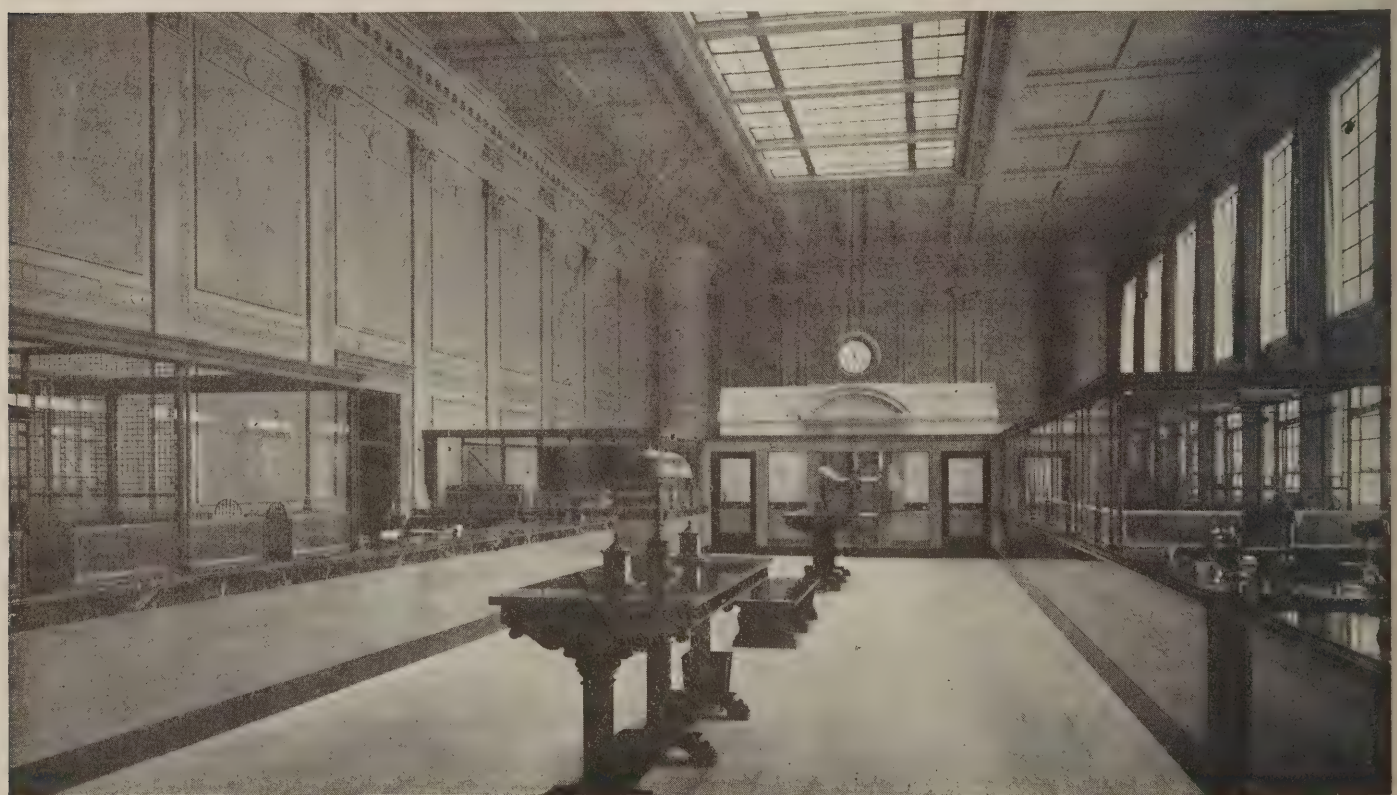
In the exterior design of the building the architects had the problem of making this store and office building look the part, and at the same time possess character such as would be equal to the prestige and standing of the bank which built it. This problem was successfully solved by a simple treatment of the main entrance in the manner shown in the picture at the bottom of page 25. The use of the large columns and the pediment above lends a distinctly bank atmosphere to the building which dominates but does not detract from the store and office building appearance of the structure. The building itself is of brick with Bedford limestone used as a trim—a very effective combination when successfully used as in this case.

S. N. Nielson was the mason contractor on this job and C. H. C. Nielson the carpenter-contractor.

To Survey Seasonal Operation in Construction Industries

SAVINGS, not only to the building industry and its workers, but to the public generally, are expected to result from the activities of a committee on seasonal operation in construction industries, appointed by Herbert Hoover, chairman of the President's Conference on Unemployment. This saving should be reflected in lower relative cost of dwellings and other buildings.

Previous surveys have indicated that most construction activity is concentrated in seven to ten months of the year, which represents waste, and direct loss to the construction industries themselves, their workers, and the public.



The banking room looking toward the vault. It is finished in a restrained Italian style, with indirect artificial lighting

The Steel Square

ONE of the oldest instruments known to the building trade is the steel square. It is one of the treasures bequeathed to the present-day builder from the time of antiquity. Although its use is known to every man who has occasion to use tools, its origin is shrouded in mystery. It is enough to say, however, that traces of its use have been found in the ruins of almost every civilization which has come to light and it is not known at what time or by whom this valuable instrument was invented.

There are many types of squares in use today ranging from the simple unmarked square to the so-called "knockdown"

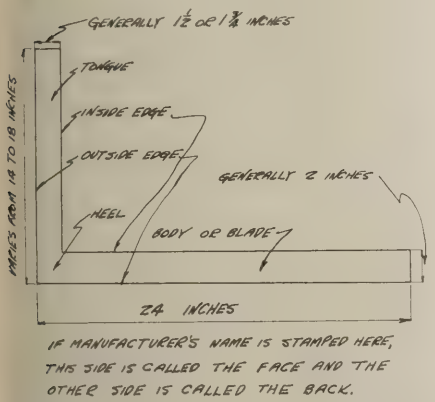
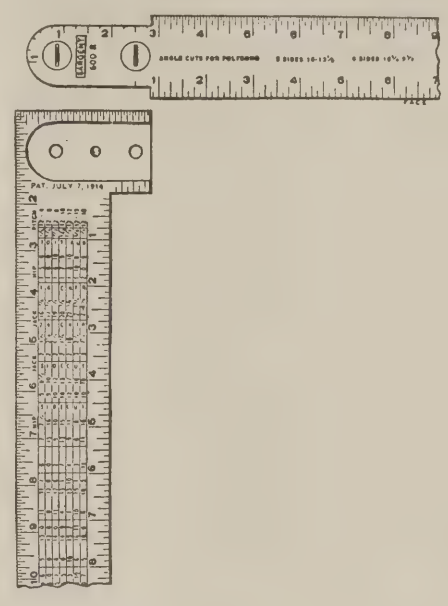

GENERALLY 1½ OR 1¾ INCHES
TONGUE
INSIDE EDGE
OUTSIDE EDGE
GENERALLY 2 INCHES
HEEL
BODY OR BLADE
ANGLES FROM 14 TO 18 INCHES
24 INCHES
IF MANUFACTURER'S NAME IS STAMPED HERE, THIS SIDE IS CALLED THE FACE AND THE OTHER SIDE IS CALLED THE BACK.

Fig. 1—Sketch showing parts and average dimensions of the ordinary steel square

square, and from squares with few markings to those with several complex tables for calculating geometrical problems. The principle upon which their use is based, however, is the same, no matter how few or how many markings appear on the face, or whether the square is large or small.

Squares are furnished in several different finishes by many of the larger manufacturers. Copper finish is a red finish and is supplied with white markings. The finish contains copper as a basis and is very striking in appearance. Another finish is a blue-black color and, with white markings, this finish may be easily read even in a bright light. It is said to be a particularly durable finish. A nickel-plated square, such as many carpenters prefer to use, has some advantages in that it does not corrode readily, nor do moisture or weak acids have much effect upon it. It is, however, difficult to



A "knockdown" square

read in bright light. Galvanized squares, furnished with red markings are particularly desirable because they are well protected against rust and the stampings may be easily seen.

The steel square is formed of two metal arms, set at right angles. The long arm is called the body or the blade (Fig. 1), and the short arm is known as the tongue. The face of a square is the side upon which the manufacture's name is stamped and the other side is called the back. In the standard steel square, the body is 24 inches long and the tongue 14 inches to 18 inches long. The width of the body is generally 2 inches and the tongue 1¾ inches although the widths may vary slightly. As ordinary dressed joists are usually 1¾ inches thick, a tongue of the same width may be readily used for spacing.

It is very important that the respective edges of the body and the tongue be at right angles to each other for all calculations into which the square enters are based on the fact that the edges of the body and the edges of the tongue intersect at an angle of 90 degrees. Therefore, if the edges of the square are not as they should be, any work laid out with the square will contain an error after the fashion shown in Fig. 2. This error will be greater the longer the line is extended.

The carpenter's square, as made today by American manufacturers, is probably the best and most reliable square made in the world, but mistakes in manufacture

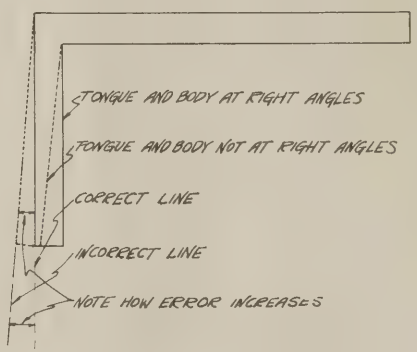

TONGUE AND BODY AT RIGHT ANGLES
TONGUE AND BODY NOT AT RIGHT ANGLES
CORRECT LINE
INCORRECT LINE
NOTE HOW ERROR INCREASES

Fig. 2—Effect of using a square when the two arms are not at right angles

are not absolutely impossible and it may be well for the man who is buying a new square to test it so that he may be assured the body and tongue are at right angles to each other. The method of testing a square is very simple and takes but a short time. The only thing required for the test is a scriber or penknife and a board about 12 inches wide and 5 feet long, with one side dressed and one edge as nearly straight as it can be made.

Place the square in the first position as shown in Fig. 3, with the inside edge of the body tight against the trued edge of the testing board, and the tongue lying on the dressed side. Then, holding the

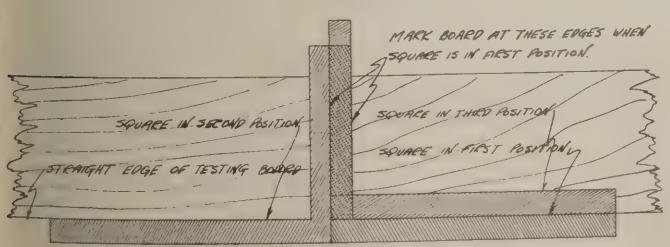

MARK BOARD AT THESE EDGES WHEN SQUARE IS IN FIRST POSITION.
SQUARE IN SECOND POSITION
SQUARE IN THIRD POSITION
SQUARE IN FIRST POSITION
STRAIGHT EDGE OF TESTING BOARD

Fig. 3—Method of testing a steel square for angular accuracy

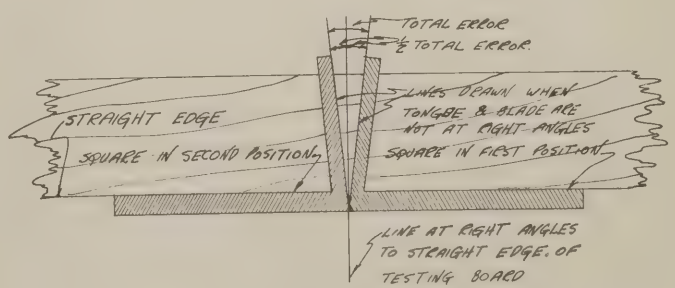

TOTAL ERROR
½ TOTAL ERROR
LINES DRAWN WHEN TONGUE & BLADE ARE NOT AT RIGHT ANGLES
STRAIGHT EDGE
SQUARE IN SECOND POSITION
SQUARE IN FIRST POSITION
LINE AT RIGHT ANGLES TO STRAIGHT EDGE OF TESTING BOARD

Fig. 4—Method for determining correct angle for steel square

body of the square tightly against the straight edge of the testing board, mark with the scriber the inside and outside edges of the tongue on the dressed board.

In making the mark, the scriber must be held firmly against the edge of the square so that the line marked coincides exactly with the edge of the square. Now reverse the square as shown in the second position in Fig. 3 and bring the outer edge of the tongue to the line marked on the board by the outer edge of the tongue in the first position. If the outer edge of the tongue and the line made on the board by the outer edge of the tongue in the first position coincide, the inner edge of the body is at right angles to the outer edge of the tongue. Then move the square in the second position until the inner edge of the tongue rests exactly along the line made by the outer edge of the tongue in the first position. If the inner edge of the tongue and the line made by the outer edge of the tongue in the first position coincide, the inner edge of the tongue and the inner edge of the body are at right angles and the two edges of the tongue are parallel to each other.

Now place the square as shown in the third position in Fig. 3 so that the outside edge of the body and the trued edge of the testing board coincide, and move it so that the outside corner of the square rests upon the mark at the edge of the testing board made by the outside edge of the tongue in the first position. If the edges of the tongue coincide with the lines for their entire length, the outside edge of the body is at right angles to both edges of the tongue. This last test cannot be made, however, until it is determined that the two lines marked on the testing board by the tongue of the square are at right angles to the straight edge of the board.

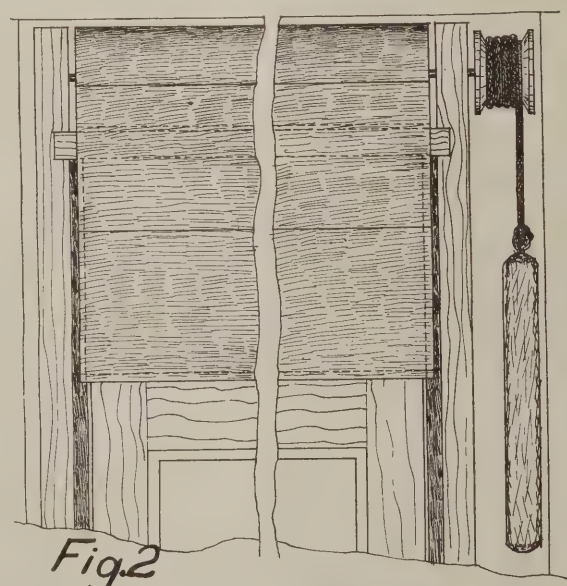
If the edges of the square are not exactly as they should be a condition will exist as shown in Fig. 4. This diagram is exaggerated so that it may be easily explained. In this case, when the square was moved from the first to the second position it was found that the lines drawn along the outside edge of the tongue did not coincide but that they diverged from a point on the edge of the testing board. The proper procedure here is to take one-half the distance between the two lines at the opposite edge of the board and mark a point. Then connect this point by a line with the point from which the lines diverge at the straight edge of the board. This line will be perpendicular to the straight edge. The outside edge of the tongue should then be filed or ground until it coincides with the line drawn between the two diverging lines when the square is placed in the first position. Then the test should proceed as outlined above. Filing or grinding the edge of the square is a very delicate job and should be very carefully done. It is as important that the markings on the edges of the square be correct as it is that the edges be true and it may be well to check the markings. It may safely be taken for granted however, that the markings on a high-grade square are correct as an error in stamping a square hardly ever occurs.

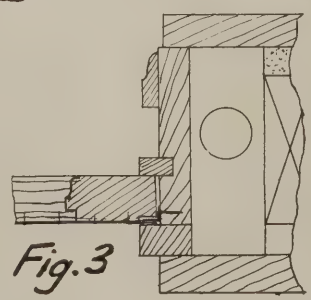
A Roller Screen

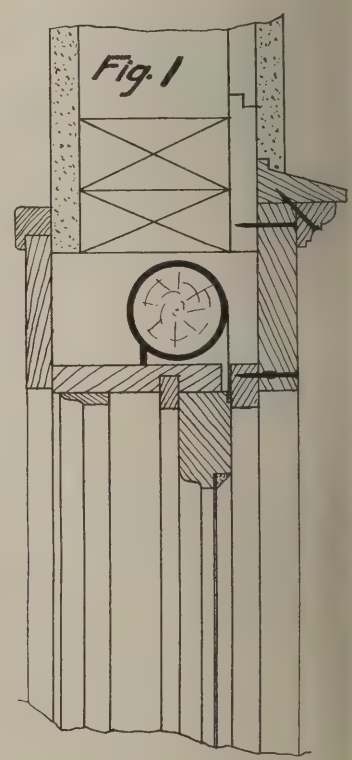
By H. H. Siegele

THE accompanying illustrations show how a roller screen is made and operated. The benefits of it should at once be apparent to every one. The scheme makes it possible to keep the screen wire in the dry, thus protecting it against the corrosive effects of the weather—rust. Not only that, but the windows are kept free from obstruction—they can be readily washed either from the inside or from the outside, and the view from the inside is left unimpaired. There will be no unsightly, torn or patched-up screens seen about the windows toward the latter part of the summer; for the screen wire, if properly cared for, will last for many years. If, however, replacement becomes necessary, it will be an easy matter—simply take off the outside head-casing, remove the old wire and fasten the new in its place. The outside head casing should be put on with screws, making access to the roller possible without much trouble. Fig. 1 gives a side view of the layout, showing the roller and the construction of the window frame at the top. It also shows how the screen is fastened to the sash. Fig. 2 shows the scheme from the outside with the casings off and the sash pulled down about 12 in. It will be noticed, by referring to this figure, that the roller is operated by means of a weight attached to a spool with a sash cord. This eliminates all other weights, sash cords and sash pulleys that ordinarily are used on the upper sash—the screen wire itself serving the purpose of the cord. Two weights are not necessary, excepting where the pocket room will not permit a weight large enough to fill the requirements. Stiffening wires, to keep the screen from bagging, are placed on the screen about 8 in. apart, as shown in Fig. 2 by the heavy lines. These stiffening wires can be soldered on, if ordinary screen-wire is used, but if the job is large enough to justify it, the screen-wire should be made to order with the stiffening wires woven into it. The sash is rabbeted on both edges on the outside in order to make room for the metal strips forming the guides for the screen-wire. These guide strips are nailed to the side jambs as shown in Fig. 3. In Fig. 2 they are indicated by the heavier shade and dotted lines. A strip of screen-wire is nailed on the bottom of the parting rail of the upper sash, which extends into the glass of the lower sash, thus making the job fly-proof throughout.

The installation of the roller-screen on new buildings can be done with a very little extra expense; on old buildings the expense will be slightly greater.







Details of construction for roller screen

Some Cold-Weather Don'ts

By A. J. R. Curtis

CONCISE information of value to contractors who will find it profitable to place concrete and masonry in cold weather:

1. Don't delay ordering supplies of sand, gravel and stone for winter concreting. The pits usually close down with the first hard freeze. Sand and gravel frozen in the cars are very difficult and expensive to handle.

2. Don't allow your concrete work to "drag." Many a job of concreting promptly handled will be completed in advance of freezing weather, permitting other parts of the work to proceed during the winter.

3. Don't wait until there is a freeze before planning measures to protect your concrete work. Have tarpaulins, building paper or straw on hand so that they can be used to cover the work as soon as the temperature seems likely to go below 40 degrees over night.

4. In covering newly deposited concrete, don't neglect the corners and other protruding portions. These are the parts of the work most likely to suffer and cause the greatest disfigurement in case of spalling or cracking as a result of freezing. Tears and holes in the tarpaulins and careless lapping are responsible for most frozen spots.

5. Don't use any more mixing water than is necessary for good results—it's the water in the mixture that freezes and less water means less chance for frozen concrete. When the weather becomes continually cold, below the freezing point frequently, the mixing water should be heated. For greatest efficiency use the mixing water as near the boiling point as possible.

6. Don't use aggregates—sand, gravel or stone—which contain ice or frost. If the use of hot water is not sufficient to melt frost and raise the temperature of the mass to 60 degrees, heat the aggregates. This can be done by means of a pipe stove, as shown in an accompanying view. Move or stir the materials frequently so that they are heated uniformly. They may be heated to 150 or 200 degrees.

7. Don't deposit concrete in cold or icy forms. The surface of the concrete may be chilled if you do, with the possibility of spalling. This applies particularly to steel forms. A steam hose or hot water used immediately before placing the concrete will prevent trouble from this source.

8. Don't move the mixed concrete any further than is necessary. Locate the mixing plant as conveniently as possible. This will conserve a great deal of heat.

9. In extremely cold weather don't let the materials be cooled off at the mixer. The mixer drum may be heated by means of a steam jet or an oil torch especially designed for this purpose.

10. When the thermometer is around zero, don't trust to tarpaulins to protect work against freezing. Run live steam under the canvas, or, if the nature of the work will permit, use salamanders (coke stoves) or lamps. If steam is available, steam coils will be found more efficient and more easily managed than salamanders.

11. Don't rely upon salt to protect concrete work against freezing. It is inefficient and unreliable. Moderate quantities of salt lower the freezing point a few degrees but

Fig. 5—Steam coil for the heating of water on the job. A coke or wood fire is built around the coil

Fig. 6—Heating sand and gravel by the ordinary method. Sections of old smokestacks, pipes and boilers are used as fire boxes

Fig. 8—Winter concreting outfit. The tank used for heating mixing water is supported on a stove of concrete blocks. The heater for aggregates has steel plates for top

Fig. 11—Building a dairy barn floor in winter. Any sort of concrete work which is done under cover can be easily protected and completed with very little hindrance or extra cost

Fig. 7—Heating concrete aggregates with a steam jet. These jets are thrust into the pile and moved as materials in the vicinity of the pipe become heated

Fig. 9—Heating mixer drum by means of a kerosene heater, a very effective means of getting the concrete into the forms at high temperature

also retard the hardening action. Larger quantities of salt are harmful to strength, promote corrosion of reinforcing metal, invite efflorescence (white chalky deposit) and are said to cause trouble from electrolysis. Moderate quantities of calcium chloride, used as recommended by a good engineer, are frequently helpful.

12. Don't depend upon the very small amount of heat generated by the reaction between the cement and water to protect the work against freezing. The heat so generated is so small as to be disregarded.

13. Don't remove forms too soon. As the temperature drops below 50 degrees Fahrenheit the length of time required for concrete to harden increases very rapidly. In extreme cold, forms are sometimes left in place two or three weeks, especially where the concrete is carrying a load of concrete above.

14. Don't take a chance of collapse by either removing forms or imposing loads on work not sufficiently hardened. Where the slightest doubt exists at least ten square feet of the concrete should be heated with hot water or steam to determine whether it has hardened or is merely frozen.

A Free Public Carpenter Shop

By John T. Bartlett

BOULDER, Colorado, claims to have the first free public carpenter shop in the country, and it has been so enthusiastically received and so extensively used the past year that a large addition to it is already being planned.

The shop is centrally located, heated and lighted, equipped with machines and work benches and a blow pipe system, and turned over to the public by the builder, Dan E. McAllister, general manager of a lumber and supply company, with just two stipulations. One is that no one shall smoke in the shop. The other is that carpenters shall clean up after themselves.

The free shop is a building some 12x60 feet, built especially for the purpose by Mr. McAllister, who saw a great need for it. Four feet from the floor, extending the whole distance of the front, is a series of 14 windows. Each contains 12 lights 10x14 inches. There are two doors centrally located in the front of the shop, which face the lumber yard. These doors are six feet wide. The building is heated by exhaust from the engine of the mill, this first heating the mill, then coming into the carpenter shop.

The machines are placed conveniently in the center of the shop, permitting the carpenters to work at benches at either end. There is a combination crosscut and daddo, an emery grinder, a drum sander with borer attachment, and a rip saw.

Though Mr. McAllister, all his life in the lumber and supply business in Boulder, realized the public need for such an institution, the instantaneous enthusiasm which greeted it was such as to exceed even his expectations. No particular class uses the carpenter shop—everyone does. The man at one bench may be a home carpenter, building a table for his wife. The next man may be a small contractor making a colonnade for a bungalow. The next two or three men may be in the employ of an apartment house contractor engaged on interior finish.

As an example of the need for such an institution, take the case of a farmer near Lafayette, Colorado, 13 miles from Boulder. The McAllister company has a yard at Lafayette. Nevertheless, the farmer went 13 "unnecessary" miles farther for lumber, simply because he would have the privilege of using the free public carpenter shop.

On rainy days the place is crowded—there may not be room for a late comer.

An interesting way in which the shop helps the public is the economy it facilitates in the use of materials. The yard now regularly stocks short lengths for which formerly there was very little call. Making a fixture adjacent to materials, getting the latter as he goes along, the carpenter can buy very efficiently.

The shop has been so successful from every angle that, as stated, an addition to it is already planned.

This fully equipped carpenter shop in Boulder, Colorado, is for the use of anyone who cares to use it

A Group of Three Houses

Drawn Especially for NATIONAL BUILDER by the Regional Bureaus of The Architects Small House Service Bureau of The United States Inc. with Complete Quantity Surveys

U.S.A. ARCHITECTS' SMALL HOUSE SERVICE BUREAU INC.

TRADE MARK

TIME enough has now elapsed for the readers of *National Builder* to have built quite a number of the houses from those designed especially for this publication by The Architects' Small House Service Bureau. Later, some photographs of some of these houses will be published. *National Builder* would like to have photographs of every house of this series which has been built, for there are a great many which have not come to our attention.

It has been our observation that those houses which were built from blueprints furnished by The Architects' Small House Service Bureau, as a rule, follow more closely the designs as originally detailed. Naturally, the greatest success is going to attend the builder who has before him in advance of construction, all possible information about the house which he is building. Not only blueprints, with complete details, but full material lists, specifications and other instruments of service which The Architects' Small House Service Bureau furnishes.

National Builder, in publishing these houses, is seeking to put before its readers not only good designs, but also plans that are thoroughly worked out, showing its readers what are the essential things to look for in a good plan. The slight investment of a few dollars in the actual blueprints—which, by the way, are furnished to readers of *National Builder* at half the regular price—is well worth the cost as insurance that the house will be *right* when completed.

Below is an explanation of the material and wiring symbols and miscellaneous data pertaining to plans on the following pages

MATERIALS		ELECTRIC WIRING SYMBOLS			
CONCRETE		CEILING OUTLET		3 WAY SWITCH	
BRICK		DROP CORD		GAS OUTLET	
WOOD		BRACKET		PUSH BUTTON	
PLASTER		BASE PLUG		BELL OUTLET	
TILE		SWITCH		BUZZER	

Dimensions are taken to outside of foundation walls, to outside of studs on exterior walls and center of studs for partitions.

Foundation walls shown concrete may be stone, brick, concrete block, or load-bearing hollow tile.

Where building ordinances permit, foundation walls may be 9 in. thick (with 20x9-in. footings), except in case of stone, which shall be 18 in. thick.

Stock numbers refer to moldings in Universal Millwork Design Book No. 20. In case these moldings cannot be procured, others of similar design and size may be substituted.

Provide 1⅛-in. screen and storm sash for all exterior openings, except ice door, unless otherwise noted. Bottom rail of storm sash to have vent.

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Six-Rooms and Sleeping Porch

House No. 6A52, designed es pecially for National Builde by the Northwestern division o The Architects' Small Hous Service Bureau of the Unite States, Inc.

A SIX-ROOM house in the English domestic type is shown here. The solid brick walls and narrow breadth make it especially suitable to city conditions. It can be built in most cities on a thirty-foot lot.

This house has the same floor plans as House No. 6A51, illustrated in the May issue of NATIONAL BUILDER, which calls for walls of clay tile or concrete tile with stucco finish.

In the design on this page there is an especially attractive arcade entrance porch with an iron hand rail at the side.

The separation of the living room and the dining room and the fact that no room has to be used as a passage way to another room will appeal especially to women. The central location of the stairs and the side entrance to basement and kitchen are other desirable features.

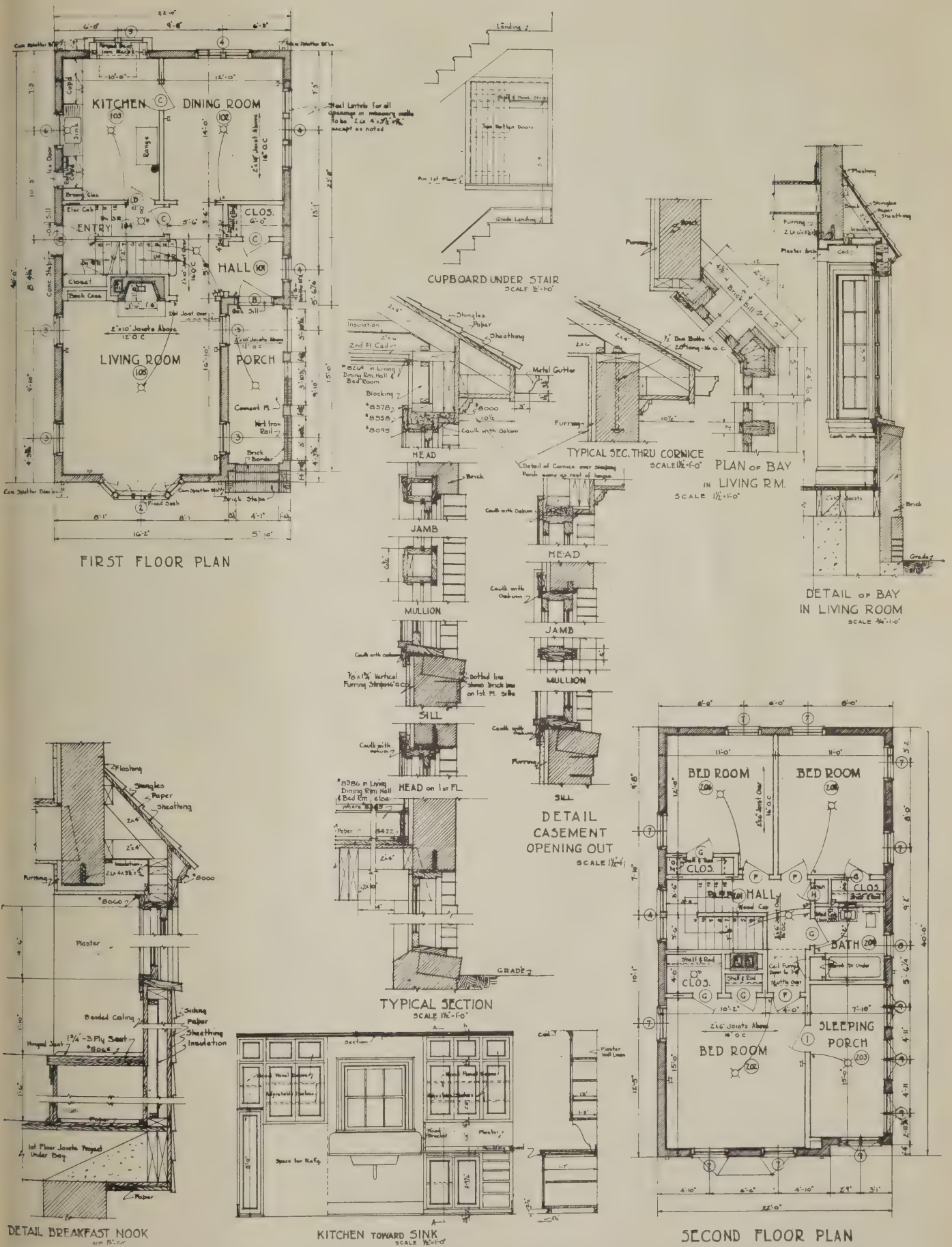
The kitchen has a breakfast nook of the pull-up table type with seat built into the recessed window. The basement contains a heater room and large, well-lighted laundry.

Three corner bedrooms, bath, linen closet and sleeping porch complete the second floor. Each bedroom has cross ventilation and good closet room. The sleeping porch will take three single beds. If not desired as a sleeping porch this might easily be converted into a sun room that would add greatly to the comfort of the second floor.

A porch can be added at the rear, opening from the dining room, as shown in Design No. 6A51.

This house is designed to face west or south and should be reversed for other facings.

The regular price of plans for this house is $30.50 ($15.50 to NATIONAL BUILDER subscribers).



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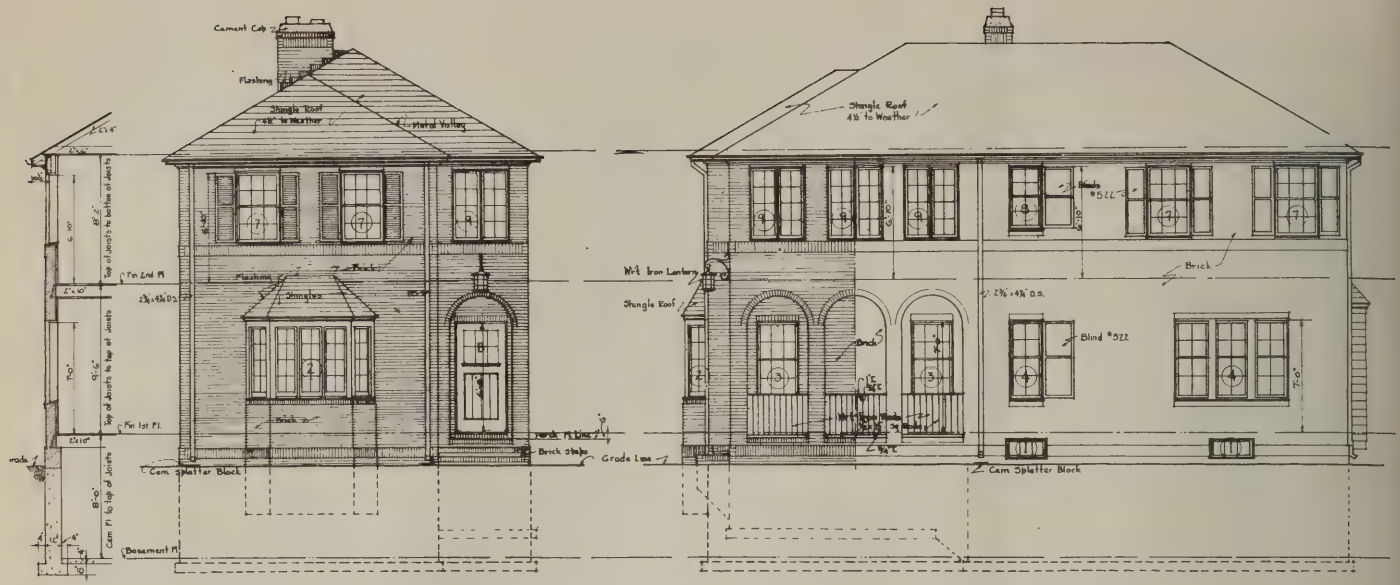
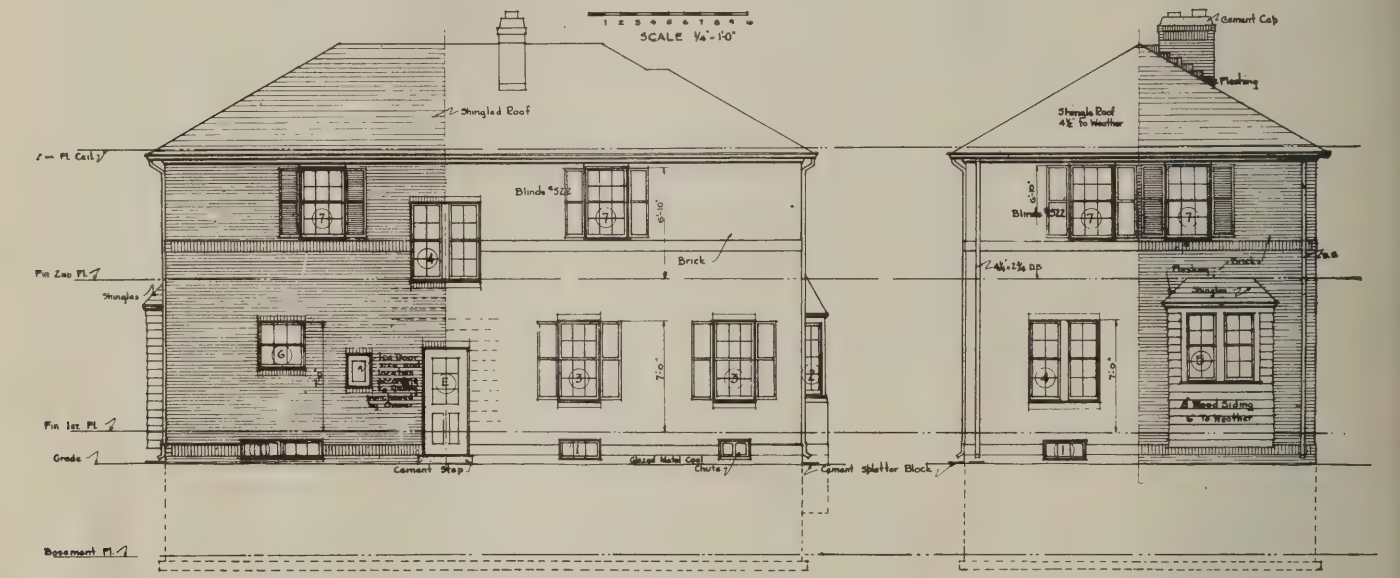
Floor plans and details for House No. 6A52, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.



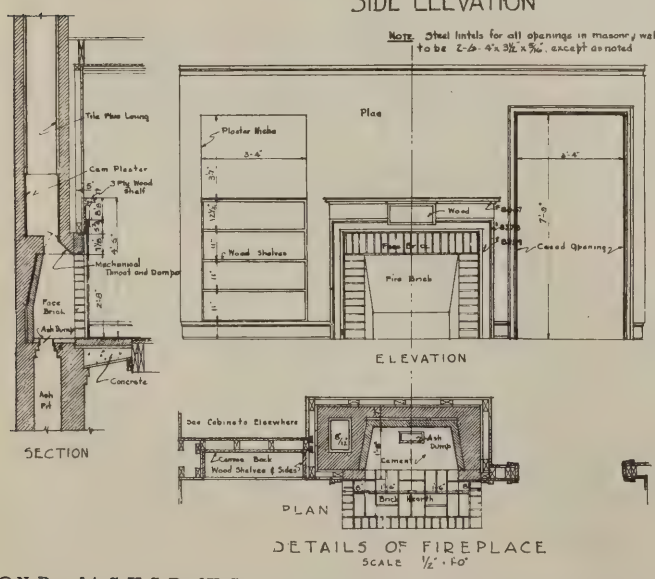
FRONT ELEVATION

SIDE ELEVATION



SIDE ELEVATION

REAR ELEVATION



DETAILS OF FIREPLACE
SCALE ½"-1'0"

ELEVATION

DETAIL OF STAIRS
SCALE ½"-1'0"

SCHEDULE OF DOORS

Quanty	Type	Size	Description	Remarks
1	A	2'-6" x 6'-6" x 1⅜"	#1105 Pine	5 Panels
1	B	3'-0" x 6'-8" x 1¾"	C-229 Oak	6 Lights
3	C	2'-6" x 7'-0" x 1¾"	#1102 Birch	
1	D	2'-8" x 7'-0" x 1¾"	" "	
1	E	2'-8" x 6'-8" x 1¾"	C-121 Pine	6 Lights
3	F	2'-6" x 6'-8" x 1¾"	#1102 Birch	
5	G	2'-4" x 6'-8" x 1¾"	" "	
1	H	1'-8" x 6'-8" x 1¾"	" "	
1	J	2'-6" x 6'-8" x 1¾"	C 320	10 Lights #1102 Maybe Used

SCHEDULE OF WINDOWS

Quanty	Type	Description	No of Lights per Light	Size	Size of Opening for Sash	Thick Mtrl	Frame
6	1	Basement Sash	3	8"x10"	2'-4" x 1'-3"	1⅜	See Detail
5	2	Casement	8	6"x12"	1'-5" x 4'-5"	1¾	"
4	3	Dbl Hung	12	9"x14"	2'-7½" x 5'-2"	1⅝	"
8	4	" "	8	9"x14"	1'-11" x 5'-2"	1⅜	"
2	5	" "	8	10"x12"	2'-1" x 4'-6"	1⅜	"
1	6	" "	6	10"x18"	2'-10½" x 5'-0"	1⅜	"
8	7	" "	12	9"x12"	2'-7½" x 4'-6"	1⅝	"
1	8	" "	8	6"x10"	1'-9" x 3'-10"	1⅜	"
8	9	Casement	8	9"x12"	1'-11" x 4'-5"	1¾	"

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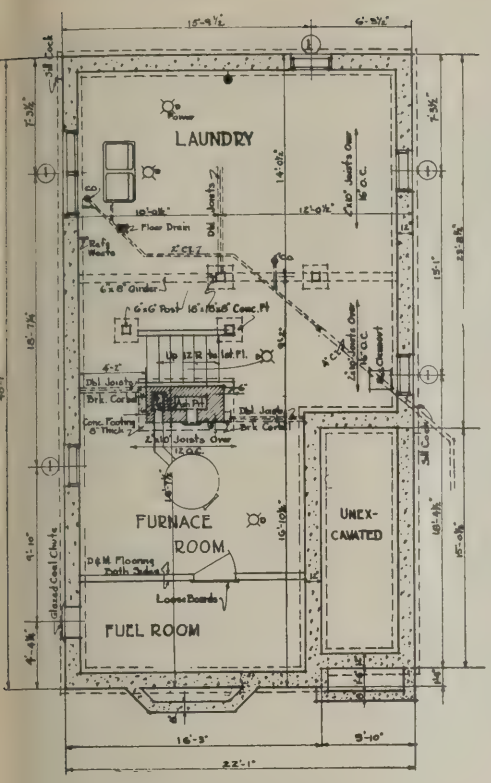
Elevations, details and door and window schedules for House No. 6A52, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.



BASEMENT PLAN

SCALE ¼"-1'-0"

EXCAVATING—210 cu yd.
BACKFILL—50 cu. yd.
FOUNDATION—If 12" concrete, 50 cu. yd. gravel, 202 sax cement; if 9" concrete, 41 cu. yd. gravel, 166 sax cement; if 12" tile, 24000 CBM tile, 18 cu. yd. mortar; if 9" tile, 18300 CBM tile, 13 cu. yd. mortar.
FACE BRICK—16000 face brick; 640 lb. mortar color; 12 cu. yd. mortar.
COMMON BRICK OR TILE—18000 common brick; 13 cu. yd. mortar.
CEMENT FLOOR—6 cu. yd. gravel; 4 cu. yd. sand; 62 sax cement; 5 spatter blocks.
CHIMNEY—2500 common brick; 300 face brick; 110 fire brick; 16 sq. ft. hearth tile; 180 inside face brick; 60 lin. ft. 8x12 flue tile; 20 lb. fire clay; 3 cu. yd. mortar; 1 cast iron ash dump; 1 throat and damper; 1 angle 4x3x5/16—4'0; 2—8x10 cleanouts; 1—8" thimble; 1—6" thimble; 5 yds. metal lath.
LATH—9 yd. metal lath over boiler; 11000 wood lath.
PLASTER—9 sq. yd. plaster on metal lath; 778 sq. yd. plaster on wood lath; 16 sq. yd. Keene's cement.

TILE FLOORS—35 sq. ft. ceramic tile; 21 lin. ft. cove base.

LUMBER—4—6x6-7 posts; 1—6x8-22 girder; 1—6x8-5 girder; 1—6x8-6 girder; 1—6x8-7 girder; 3—2x4-14 basement partition plates; 12—2x4-7 basement partition studs; 280 ft. D&M basement partition sheathing; 18—2x10-14 first floor joist; 18—2x10-9 first floor joist; 12—2x10-18 first floor joist; 750 ft. com. bds. first floor subfloor; 1000 ft. 13/16x1½ first floor finish floors; 3—2x10-16 headers; 3—2x10-14 basement stair horses; 4 ft. 2" plank cleanout cover; 252 lin. ft. 2x4 first floor partition plates; 74—2x4-9 first floor partition studs; 118—1x2-16 wall stripping; 1300 lin. ft. grounds; 400 lin. ft. 1x3 bridging; 18—2x10-24 second floor joist; 13—2x10-16 second floor joist; 13—2x10-7 second floor joist; 860 ft. com. bds. second floor subfloor; 1100 ft. 13/16x1½ second floor finish floor; 360 lin. ft. 2x4 second floor partition plates; 105—2x4-8 second floor partition studs; 3—2x10-16 stair horses; 18—2x6-24 second floor ceiling joist; 13—2x6-22 second floor ceiling joist; 980 ft. D&M attic floor; 2—2x6-16 headers; 4—2x10-14 headers; 118 lin. ft. 2x8 wall plates; 1—1x8-18 ridge rafters; 4—2x6-18 hip rafters; 2—2x6-14 hip rafters; 84—2x4-14 rafters; 1800 ft. com. bds. roof sheathing; 13M shingles; 8—2x6-14 headers; 28—2x4-16 lookouts; 25—2x4-18 scaffold and extras; 10—2x4-16 scaffold and extras; 8—2x6-16 scaffold and extras; 8—2x8-18 scaffold and extras; 4—2x10-16 scaffold and extras; 100 ft. ceiling porch.

MILLWORK—Frames: 4 single sash 8x10-3L-1⅜; 1 twin sash 8x10-3L-1⅜; 1 triple casement 6x12-8L-1¾; 2 single casment 6x12-8L-1¾; 4 single wd. 9x14-12L-1⅜; 1 single wd. 9x14-8L-1⅜; 2 mul. wd. 9x14-8L-1⅜; 1 triple wd. 9x14-8L-1⅜; 1 mul. wd. 10x12-8L-1⅜; 1 single wd. 10x15-6L-1⅜; 8 single wd. 9x12-12L-1⅜; 1 single wd. 8x10-8L-1⅜; 4 mul. casements 9x12-8L-1¾. **Windows:** 6 sash 8x10-3L-1⅜; 5 sash 6x12-8L-1¾; 4 wds. 9x14-12L-1⅜; 8 wds. 9x14-8L-1⅜; 2 wds. 10x12-8L-1⅜; 1 wd. 10x15-6L-1⅜; 8 wds. 9x12-12L-1⅜; 1 wd. 8x10-8L-1⅜; 8 sash 9x12-8L-1¾. **Storm Sash:** 6—8x10-3L-1⅛; 5—6x12-8L-1⅛; 4—9x14-12L-1⅛; 8—9x14-8L-1⅛; 2—10x12-8L-1⅛; 1—10x15-6L-1⅛; 8—9x12-12L-1⅛; 1—8x10-8L-1⅛; 8—9x12-8L-1⅛. **Screens:** 6—8x10-3L-1⅛; 5—6x12-8L-1⅛; 4—9x14-12L-1⅛; 8—9x14-8L-1⅛; 2—10x12-8L-1⅛; 1—10x15-6L-1⅛; 8—9x12-12L wds.; 1 single for 9x14-8L wds. 1 single for 8x10-8L wds. **Outside Door Frames:** 1—3'0x6'8-1¾; 1—2'8x6'8-1¾; 1 icing door frame. **Outside Doors:** 1—3'0x6'8-1¾ (C-229); 1—2'8x6'8-1¾ (C-121); 1 icing door. **Storm Doors:** 1—3'0x6'8-1⅛; 1—2'8x6'8-1⅛. **Screen Doors:** 1—3'0x6'8-1⅛; 1—2'8x6'8-1⅛. **Outside Millwork:** 152 lin. ft. cornice; 42 lin. ft. ceiling cove. **Interior Doors:** 1—2'6x6'6-1⅜ (No. 1105); 3—2'6x7'0-1¾ (No. 1102); 1—2'8x7'0-1¾ (No. 1102); 3—2'6x6'8-1¾ (No. 1102); 5—2'4x6'8-1¾ (No. 1102); 1—1'8x6'8-1¾ (No. 1102); 1—2'6x6'8-1¾ (No. C-320). **Jambs:** 1—2'6x6'6; 3—2'6x7'0; 1—2'8x7'0; 3—2'6x6'8; 5—2'4x6'8; 1—1'8x6'8; 1—2'6x6'8; 2—3'6x7'0; 1—4'0x7'0. **Interior Trim:** 4 sides single 8x10-3L; 1 side twin 8x10-3L; 1 side triple casement 6x12-8L; 2 sides single casement 6x12-8L; 4 sides single window 9x14-12L; 1 side single window 9x14-8L; 2 sides mul. wd. 9x14-8L; 1 side triple wd. 9x14-8L; 1 side mul. wd. 10x12-8L; 1 side single wd. 10x15-6L; 8 sides single wd. 9x12-12L; 1 side single wd. 8x10-8L; 4 sides mul. casement 9x12-8L. **Interior Trim:** 1 side door 3'0x6'8; 1 side door 2'8x6'8; 1 side icing door; 2 side door 2'6x6'6; 6 side door 2'6x7'0; 2 side door 2'8x7'0; 6 side door 2'6x6'8; 10 side door 2'4x6'8; 2 side door 1'8x6'8; 2 side door 2'6x6'8; 4 side opng. 3'6x7'0; 2 side opng. 4'0x7'0; 1 flight basement stairs with rail; 1 flight main stairs with rail; 1 towel cabinet; 1 medicine cabinet (No. 2835); 1 linen cabinet; 1 utility door; 1 utility door jamb; 1 utility door trim; 1 scuttle door; 1 scuttle door jamb; 1 scuttle door trim; 1—3'6 bookcase; 1 mantel shelf; 1—3'6 closet; 1 meter cabinet; 1 broom cabinet; 1—3'0 cabinet; 1—4'0 cabinet; 1—5'6 hinged seat; 600 lin. ft. base; 600 lin. ft. base shoe; 600 lin. ft. base molding; 68 lin. ft. ceiling cove; 264 lin. ft. picture molding; 30 lin. ft. closet shelving; 30 lin. ft. closet hook strip; 20 lin. ft. closet clothes rod; 30 lin. ft. band molding; 6 lin. ft. threshold.

INSULATION—840 sq. ft. ½" vegetable fibre or equal for ceilings; 1900 sq. ft. ½" vegetable fibre or equal for walls; 4 rolls damp proof paper for walls; 4 rolls felt roof; 3 rolls felt floors.
REINFORCED STEEL—32—⅜ rods 6'0.
TINWORK—132 lin. ft. gutter; 4 outside miters; 2 inside miters; 35 gutter hangers; 5 nipples; 5 elbows; 5 offsets; 5 shutoffs; 5 strainers; 100 lin. ft. conductor; 15 conductor hooks; 28 lin. ft. valley tin; 18 lin. ft. ridge roll; 3 finials; 84 lin. ft. hip roll; 30 lin. ft. flashing tin; 1 saddle; 14 lin. ft. chimney flashing.
STEEL LINTELS—4 for single sash 8x10-3L; 1 for twin sash 8x10-3L; 1 for triple cash 6x12-8L; 2 for single sash 6x12-8L; 4 for single windows 9x14-12L; 1 for single window 9x14-8L; 2 for mul. wd. 9x14-8L; 1 for triple wd. 9x14-8L; 1 for mul. wd. 10x12-8L; 1 for single wd. 10x15-6L; 8 for single wd. 9x12-12L; 1 for single wd. 8x10-8L; 4 for mul. casements 9x12-8L; 1 for 3'0 door; 1 for 2'8 door; 1 for icing door; 1 for 8'0 bay.
ORNAMENTAL IRON—1 wrought iron bracket lantern; 3 rails 3'10x2'8.
CAULKING—21 single frames; 8 mullion frames; 2 triple frames; 2 door frames; 1 icing door; 1 coal chute.
WEATHER STRIPPING—6 sash 8x10-3L; 5 sash 6x12-8L; 4 windows 9x14-12L; 8 windows 9x14-8L; 2 windows 10x12-8L; 1 window 10x15-6L; 8 windows 9x12-12L; 1 window 8x10-8L; 8 sash 9x12-8L; 1 door 3'0x6'8; 1 door 2'8x6'8; 1 icing door.
EXTERIOR PAINTING—4 gal. trim paint; 1 gal. boiled oil; 39 gal. shingle stain; ½ gal. sash color; ½ gal. shutter paint; 1 gal. screen paint; ½ gal. shellac; 1 gal. japan; 1 gal. turpentine.
INTERIOR PAINTING—13 gal. white; 8 gal. enamel; 6 gal. filler stain; 3 gal. shellac; 9 gal. varnish; 3½ gal. floor shellac; 5 gal. floor varnish; 2 gal. oil; 1 gal. japan; 1 gal. turpentine; 1 gal. alcohol; 1 qt. metallic paint. 4 lbs. steel wool; 4 doz. sheets assorted sandpaper.
HARDWARE—6 cellar sash sets; 13 casement sash sets; 24 sash locks; 24 sash lifts; 43 storm sash sets; 43 screen sets; 10 sets shutter hardware for pairs; 2 sets shutter hardware for singles; 1 front door set with butts; 1 rear door set with butts; 1 icing door set with butts; 2 storm door sets; 2 screen door sets; 1 floor hinge; 2 push plates; 14 inside door sets with butts; 18 door bumpers; 4 doz. clothes hooks; 4 stair rail brackets; 720 lbs. sash weights; 5 hanks sash cord; 1300 lb. assorted nails; 6 lb. assorted brads; 1 coal chute glazed; for towel cabinet: 1 pr. ornamental butts, 1 cupboard turn; for medicine cabinet; 1 cupboard turn, 1 pr. ornamental hinges; 6 drawer pulls, linen closet; 4 friction stays, utility door; 1 pr. hinges for scuttle door; for broom closet: 1 pr. ornamental butts, 1 cupboard turn; for kitchen cabinet: 6 pr. ornamental butts, 4 cupboard turns, 2 elbow catches; for kitchen cabinet: 1 set castors, 1 bin pull, 7 pr. ornamental butts, 5 cupboard turns, 2 elbow catches; for meter cabinet: 1 cupboard turn, 1 pr. ornamental butts; 1 pr. hinges for seat; for cupboard under stairs: 2 pr ornamental butts, 1 cupboard turn, 1 elbow catch.

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Basement plan and quantity survey for House No. 6A52, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.

Concrete Floor Tests

THE hollow tile and reinforced concrete floors of the Arlington Building, Washington, D. C., occupied by the U. S. Veterans Bureau, were tested by loading them and measuring the deformation.

In this structure, the tiles were placed in rows and spaced four inches in each direction. Reinforcing steel was placed in these spaces near the bottom of the slab in the panel and near the top of it across the supporting beams. The concrete was poured around the reinforcing bars and into the open ends of the tiles.

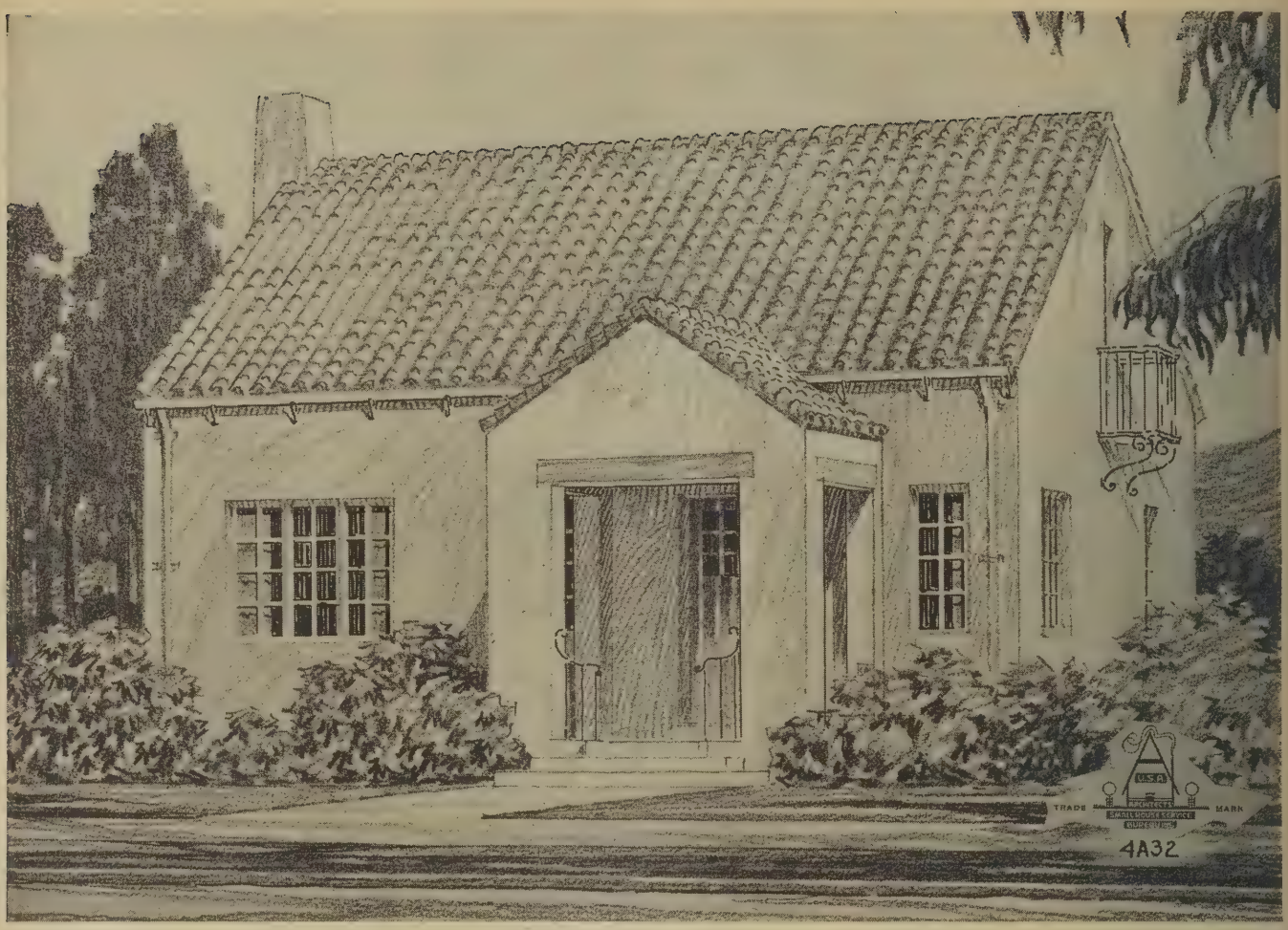
The building was intended for a hotel but was later turned over to the government for the use of the Veterans Bureau. The original design load of 75 pounds per square foot was increased to 100 pounds and the increased strength obtained by a two-inch layer of concrete over the tops of the tiles.

The panels of the floor were loaded with sand bags up to 380 pounds per square foot and the stresses in the steel and the concrete measured. The maximum stresses developed in the steel reinforcement were about 27,000 pounds per square inch and those in the concrete about 1600 lb. per square inch. The effect of time under load was to increase the stresses in the reinforcing steel from 15 to 20 per cent. This was particularly pronounced in the first 20 hours and was comparatively small later.

The panels tested varied in the ratio of length to width. It was found that with the increase of that ratio, the stresses in the reinforcing steel at the bottom of the slab and those at the top of the slab (across the girders) increased in the direction of the short span and decreased in the long one. The stresses in the girders were lower than those in the slab.

The factor of safety of the structure was greater than two. This factor is the ratio of the maximum load the structure can sustain to the load which can be safely allowed when the building is in use.

These tests are described in Technologic Paper No. 236 of the Bureau of Standards, copies of which can be obtained from the Superintendent of Documents, Government Printing Office, Washington, D. C. The price is 15 cents.



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Two Extra Bedrooms in This Four-Room House

House No. 4A32, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.

THIS charming little house in the Italian type can be built either as a four-room home or be made into a six-room house by finishing two bedrooms in the second story. The working drawings for the completed second floor are furnished with the complete plans.

This house has masonry foundations, tile superstructure and tile roof. The roof may be of shingles to reduce the cost.

The picturesque character of the house is carried out by heavy beams above the openings of the porch and brick sills beneath the windows. The front porch has a cement floor and hand wrought iron railing. The door from the bedroom on the second floor leads out to a balcony with wrought iron railing. Here rugs may be shaken and bedding sunned and aired, so that this little balcony serves a useful as well as decorative purpose.

The floor plan is essentially the same as House No. 4A26 illustrated in the January issue of NATIONAL BUILDER.

Living room and dining room are separated by a wide cased opening that makes both rooms seem larger and more pleasant. There is a good coat closet opening from the living room. Bath, first floor bedroom, stairway, kitchen and linen closet open onto the small bedroom hall. This permits one to get from one room to another without passing through the living room or dining room.

The kitchen is arranged so that the working space is convenient and well lighted. If desired a dining alcove can be added at the back as indicated on the working drawings.

The second floor bedrooms each have a large closet and good ventilation through the windows in the gables and the dormer in the rear. There is a complete basement with large, well-lighted laundry.

The house is designed to face west or north and should be reversed for other facings.

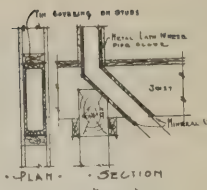
The regular price of this design is $20.50 ($10.50 to NATIONAL BUILDER subscribers).

SCHEDULE OF WINDOWS

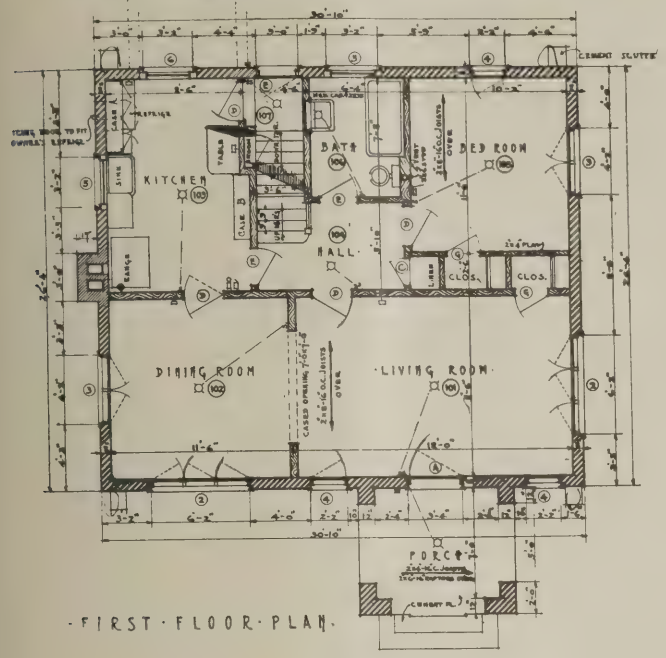
QUANTITY	TYPE	DESCRIPTION	NO. OF LIGHTS	GLASS SIZE	SIZE OF ROUGH OPG.	SASH THICKNESS	REMARKS
3	1	BASEMENT	3	8"x10"	2'6" x 1'-6"	1 3/8	
2 TRIPLE	2	CASEMENT	6 EACH UNIT	8"x13"	6'-2" x 4'-0"	"	
2 PAIR	3	"	"	"	4'-2" x 4'-8"	"	
3	4	"	"	"	2'-2" x 4'-8"	"	
2	5	DOUBLE HUNG	6	10"x16"	3'-2" x 3'-4"	"	
1	6	"	12	10"x13"	3'-2" x 4'-10"	"	
2	7	CASEMENT	6	8"x10"	2'-0" x 4'-0"	"	
2	8	"	8	8"x10"		"	STEEL WALL
1 PAIR	9	"	8 EACH UNIT	8"x10"		"	STEEL WALL

SCHEDULE OF DOORS

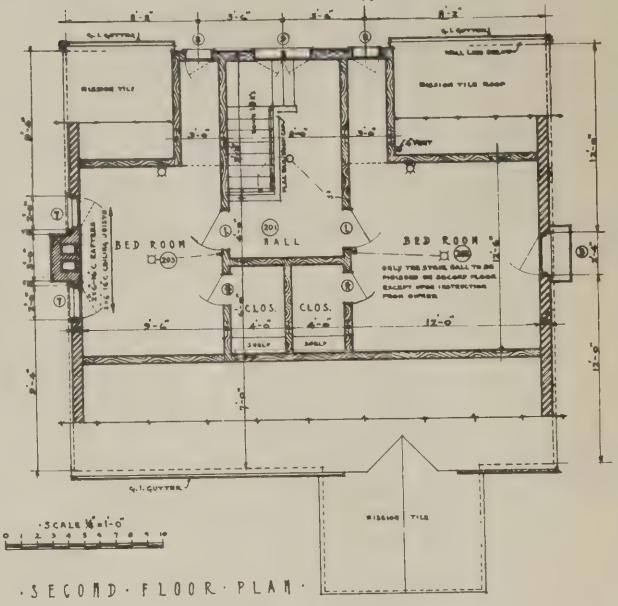
QUANTITY	TYPE	SIZE	REMARKS	DESCRIPTION
1	A	3'-0" x 7'-0" x 1 3/4"	OAK	SEE DETAIL
1	B	2'-0" x 6'-8" x 1 3/8"	SASH DOOR	
1	C	1'-9" x 7'-0" x 1 3/8"	INTERIOR	WHITE ENAMEL FINISH
4	D	2'-6" x 7'-0" x 1 3/8"	INTERIOR	WHITE ENAMEL FINISH
2	E	2'-4" x 7'-0" x 1 3/8"	"	"
1	F	2'-8" x 7'-0" x 1 3/8"	SASH DOOR	$ 7.87
2	G	2'-0" x 7'-0" x 1 3/8"	INTERIOR	$ 11.02
2	H	2'-0" x 6'-8" x 1 3/8"	INTERIOR	" 9.002
2	I	2'-6" x 6'-8" x 1 3/8"		
1	J	2'-0" x 6'-8" x 1 3/8"		SCREEN PANEL



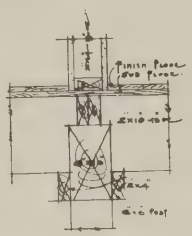
RECOMMENDED METHOD FOR INSULATION AROUND HOT AIR PIPES IF FURNACE HEATING IS USED



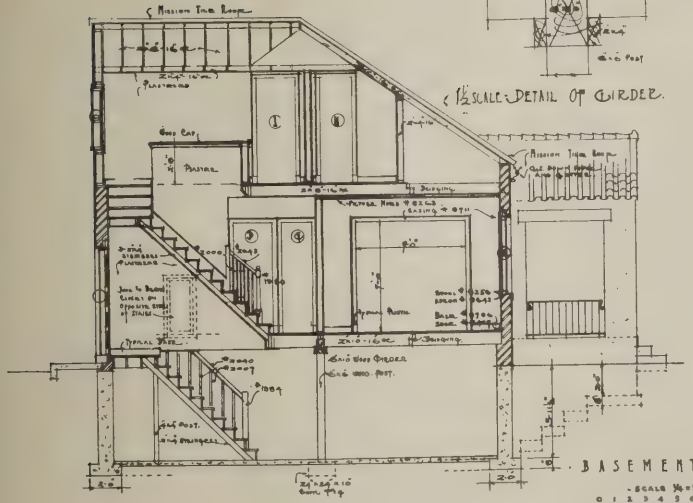
FIRST FLOOR PLAN



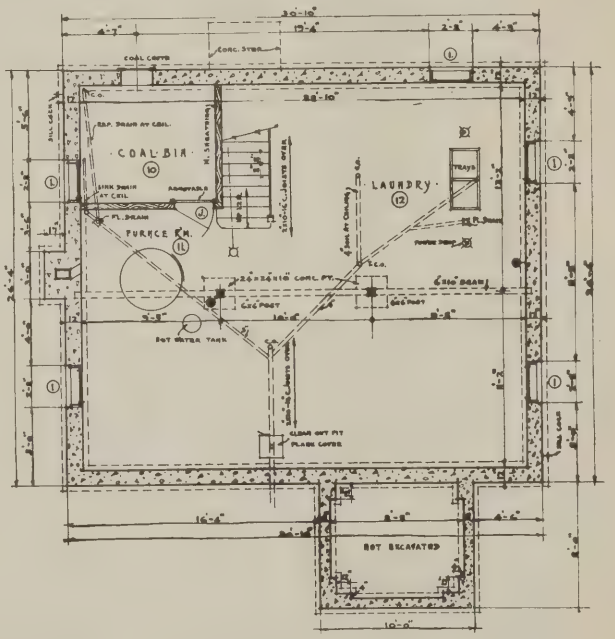
SECOND FLOOR PLAN



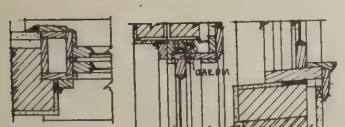
1½" SCALE DETAIL OF GIRDER



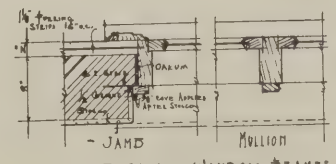
SECTION



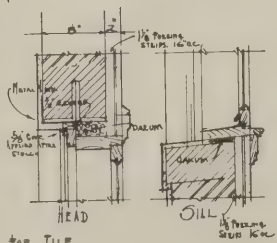
BASEMENT PLAN



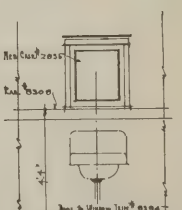
JAMB HEAD SILL
DETAIL OF DOUBLE HUNG WINDOWS
SCALE 1½"-1'-0"



JAMB MULLION
TYPICAL WINDOW FRAMES FOR TILE WALLS FURRED. IF WALLS ARE NOT FURRED USE FRAMES 2" LESS IN WIDTH.
SCALE 1½" - 1'-0"



HEAD SILL



BATH ROOM TRIM
SCALE ½" = 1'-0"

DECK TO BE DIED AROUND HEADS AND SILLS OF ALL WINDOWS AND DOORS AT 30° BY DOUBLE DIAG. WINDOWS. THIS APPLIES TO STANDARD OR SPECIAL INTERLOCKING TILE.

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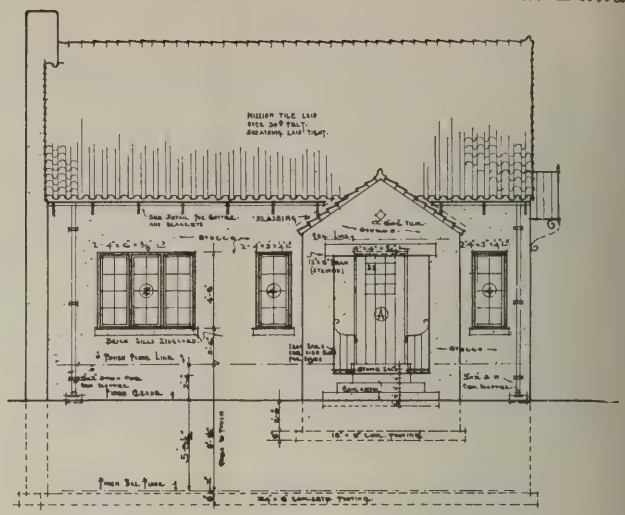
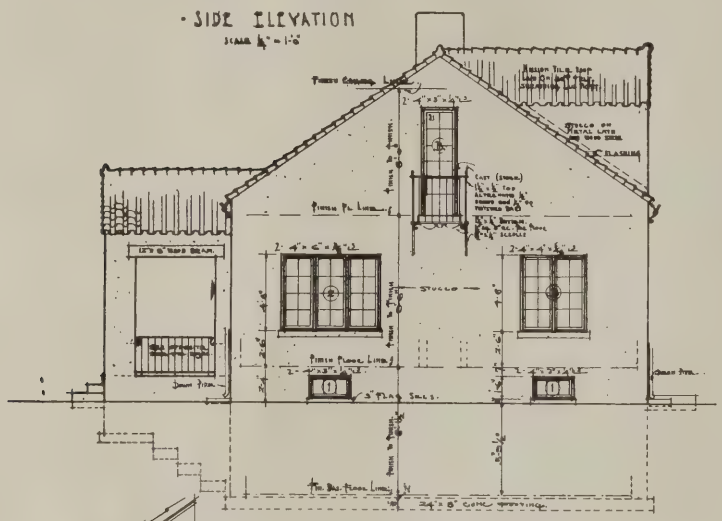
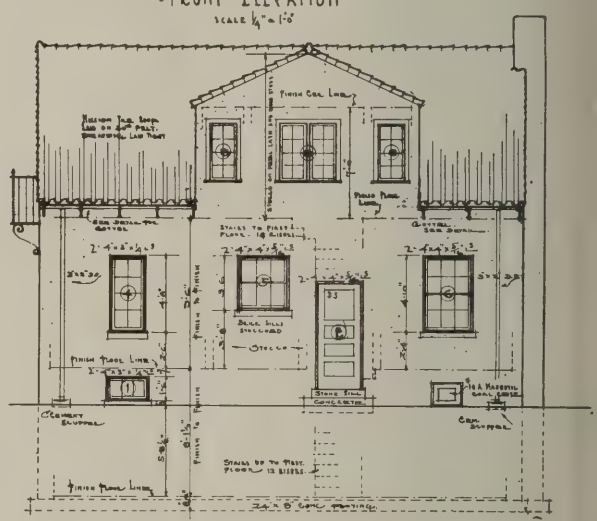
Plans, section, details and door and window schedules for House No. 4A32, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.



• FRONT ELEVATION •
SCALE ¼"=1'0

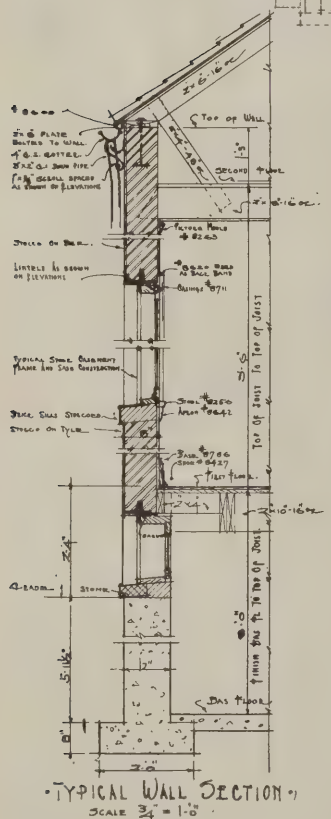
• SIDE ELEVATION •
SCALE ¼"=1'0



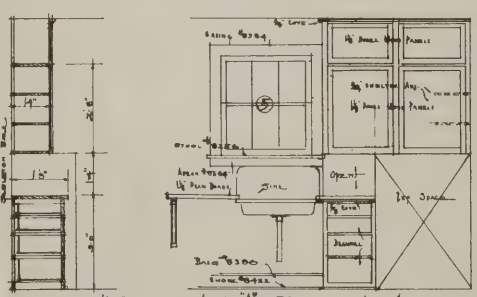


• SIDE ELEVATION •
SCALE ¼"=1'0

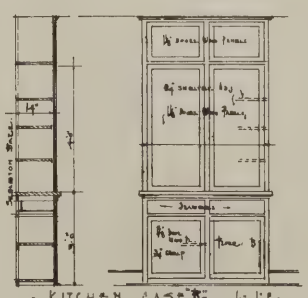
• REAR ELEVATION •
SCALE ¼"=1'0



• TYPICAL WALL SECTION •
SCALE ¾"=1'0



• KITCHEN CASE "A" & TRIM SCALE ½"=1'0 •



• KITCHEN CASE "B" SCALE ½"=1'0 •

EXCAVATING—190 cu. yd.
BACKFILLING—40 cu. yd.
FOUNDATION—If 12″ concrete, 46 cu. yd. gravel, 186 sax cement; if 9″ concrete, 35 cu. yd. gravel, 142 sax cement; if 12″ tile, 21000 CBM tile, 15 cu. yd. mortar; if 9″ tile, 16700 CBM tile, 12 cu. yd. mortar.
TILE FOR WALLS—16000 CBM tile; 12 cu. yd. mortar.
CEMENT FLOOR—6 cu. yd. gravel; 4 cu. yd. sand; 62 sax cement; 4 cement spatter blocks.
CHIMNEY—1200 common brick; 48 lin. ft. flue tile 8x12; 1 cu. yd. mortar; 2—8x10 clean outs; 1—8″ thimble; 1—6″ thimble; 3 yd. metal lath.
LATH—8100 wood lath; 9 yd. metal lath over boiler.
STUCCO—210 sq. yd. stucco on tile; 14 sq. yd. stucco on metal.
PLASTER—9 sq. yd. plaster on metal lath; 580 sq. yd. plaster on wood lath; 14 sq. yd. Keene's cement.
TILE FLOORS—40 sq. ft. ceramic tile; 23 lin. ft. cove base.
TILE INSERT—1—6x6 tile.
LUMBER—12—6x6-7 posts; 1—4x4-7 posts; 30 lin. ft. 6x10 beam; 60 lin. ft. 2x4 beam girder; 60 lin. ft. 2x4 beam plates; 4—2x4-12 basement stair horses; 4 ft. 2″ plank clean out cover; 48 lin. ft. 2x4 basement partition plates; 13—2x4-7 basement partition studs; 160 ft. D&M basement partition sheathing; 24—2x10-26 first floor joist; 4—2x10-14 headers and doubles; 800 ft. com. bds. first floor subfloor; 960 ft. 13/16x1½ first floor finish floor; 300 lin. ft. 1x3 bridging; 1100 lin. ft. furring strips; 1300 lin. ft. grounds; 240 lin. ft. 2x4 first floor partition plates; 70—2x4-9 first floor partition studs; 3—2x4-14 stair stringers; 24—2x8-26 second floor joists; 4—2x8-14 second floor joist headers and doubles; 800 ft. com. bds. second floor subfloor; 660 ft. 13/16x1½ second floor finish floors; 2—12x8-6 beams porch; 1—12x8-7 beams porch; 7—2x4-10 porch ceiling joist; 100 ft. ceiling porch; 156 lin. ft. 2x4 second

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Elevations, details and quantity survey for House No. 4A32, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.

floor partition plates; 45—2x4-8 second floor partition studs; 24—2x4-8 second floor ceiling joist; 48—2x6-16 rafters; 14—2x6-6 rafters porch; 18—2x6-8 rafters dormer; 9—2x4-14 dormer ceiling joist; 66 lin. ft. 2x4 dormer plates; 22—2x4-7 dormer studs; 1500 ft. boards roof sheathing; 300 ft. shiplap wall sheathing; 108 lin. ft. 2x8 wall plates; 25—2x4-18 headers and scaffold; 8—2x6-16 headers and scaffold; 6—2x4-14 headers and scaffold; 3—2x8-16 headers and scaffold; 4—2x10-14 headers and scaffold.

MISSION TILE ROOF—12 squares mission tile; 14 squares 30 lb.felt.

BRICK SILLS—68 lin. ft. brick sills.

STONE SILL—8 lin. ft. stone sills.

ORNAMENTAL IRON—1 balcony with scroll brackets; 2 entrance seats; 18 gutter brackets.

MILLWORK—Frames (Brick wall detail): 5 sash 8x10-3L-1⅜; 2 triple casement 9x13-8L-1⅜; 2 mul. casement 9x13-8L-1⅜; 3 single casement 9x13-8L-1⅜; 2 single wd. 10x16-6L-1⅜; 1 single wd. 10x12-12L-1⅜; 2 single casement 8x10-8L-1⅜; 2 single casement 8x10-8L-1⅜ stud; 1 mul. casement 8x10-8L-1⅜. **Windows:** 5 sash 8x10-3L-1⅜; 13 sash 9x13-8L-1⅜; 2 windows 10x16-6L-1⅜; 1 wd. 10x12-12L-1⅜; 6 sh. 8x10-8L-1⅜. **Storm Sash:** 5—8x10-3L-1⅛; 13—9x13-8L-1⅛; 2—10x16-6L-1⅛; 1—10x12-12L-1⅛; 6—8x10-8L-1⅛. **Screens:** 5—8x10-3L-1⅛; 13—9x13-8L-1⅛; 2—10x16-6L-1⅛; 1—10x12-12L-1⅛; 6—8x10-8L-1⅛. **Outside Door Frames:** 1—3'0x7'0-1¾; 1—2'0x6'8-1⅜; 1—2'8x7'0-1¾; 1—2'0x6'8-1⅜; 1—2'8x7'0-1¾ (No. 751); 1 icing door. **Storm Doors:** 1—3'0x7'0-1¾; 1—2'0x6'8-1⅛; 1—2'8x7'0-1⅛. **Screen Doors:** 1—3'0x7'0-1⅛; 1—2'0x6'8-1⅛; 1—2'8x7'0-1⅛. **Exterior Millwork:** 160 lin. ft. cornice; 40 lin. ft. porch cove. **Interior Doors:** 1—1'9x7'0-1⅜ (No. 1102); 4—2'6x7'0-1⅜ (No. 1102); 2—2'4x7'0-1⅜ (No. 1102); 2—2'0x7'0-1⅜ (No. 1102); 2—2'0x6'8-1⅜ (No. 902); 2—2'6x6'8-1⅜ (No. 902); 1—2'6x6'8-1⅜ (5XP). **Jambs:** 1—1'9x7'0; 4—2'6x7'0; 2—2'4x7'0; 2—2'0x7'0; 2—2'0x6'8; 2—2'6x6'8; 1—2'6x6'8; 1—7'0x7'0. **Interior Trim:** 5 sides 8x10-3L; 2 sides triple 9x13-8L; 2 sides mul. 9x13-8L; 3 sides single 9x13-8L; 2 sides single 10x16-6L; 1 side single 10x12-12L; 2 sides single 8x10-8L; 2 sides single 8x10-8L; 1 side mul. 8x10-8L; 1 side door 3'0x7'0; 1 side door 2'0x6'8; 1 side door 2'8x7'0; 2 side door 1'9x7'0; 8 side door 2'6x7'0; 4 side door 2'4x7'0; 4 side door 2'0x7'0; 4 side door 2'0x6'8; 4 side door 2'6x6'8; 2 side door 2'6x6'8; 2 side opng. 7'0x7'0; 1 flight basement stair with rail; 1 flight main stair with rail; 1 linen cabinet; 1 medicine cabinet No. 2835; 1 broom cabinet; 1—3'0 table; 1—4'0 case; 1—4'6 case; 1 side icing door trim; 400 lin. ft. base; 400 lin. ft. base shoe; 400 lin. ft. base molding; 104 lin. ft. ceiling cove; 12 lin. ft. closet shelving; 12 lin. ft. closet hook strip; 12 lin. ft. clothes pole; 150 lin. ft. picture molding; 1 drain board. **Note:** If dining and living room trim is changed it will affect the following items included above: 1 door 3'0x7'0-1¾; 1 side trim 3'0x7'0; 2 doors 2'6x7'0-1⅜ (No. 1102); 2 side trim 2'6x7'0; 1 door 2'0x7'0-1⅜ (No. 1102); 1 side trim 2'0x7'0; 1 jamb 7'0x7'0; 2 side trim 7'0x7'0; 2 single side trim 9x13-8L; 1 mul. side trim 9x13-8L; 2 triple side trim 9x13-8L; 104 lin. ft. ceiling cove; 100 lin. ft. picture molding; 90 lin. ft. base; 90 lin. ft. base shoe; 90 lin. ft. base molding; 490 lin. ft. 13/16x1½ flooring. **Note:** If second floor except hall is unfinished, deduct: 2 doors 2'0x6'8-1⅜ (No. 1102); 2 jambs 2'0x6'8; 4 side trim 2'0x6'8; 2 side trim 2'6x6'8; 1 side trim 2'6x6'8; 2 side trim 8x10-8L; 2 side trim 8x10-8L; 1 side mul. trim 8x10-8L; 156 lin. ft. base; 156 lin. ft. base shoe; 156 lin. ft. base molding; 8 lin. ft. closet shelving; 8 lin. ft. closet hook strip; 8 lin. ft. closet clothes rod; 462 ft. 13/16x1½ finish flooring.

TINWORK—28 lin. ft. flashing; 42 lin. ft. gutter; 8 gutter ends; 52 lin. ft. conductor pipe; 4 strainers; 4 nipples; 4 offsets; 4 elbows; 4 shutoffs.

INSULATION—720 ft. ½" vegetable fibre or equal for roof; 200 ft. ½" vegetable fibre or equal for walls; 3 rolls felt floors; 4 rolls waterproof paper walls.

CAULKING—15 single frames; 2 triple frames; 3 mullion frames; 3 door frames; 1 icing frame; 1 coal chute.

WEATHER STRIPPING—5 sash 8x10-3L; 13 sash 9x13-8L; 6 sash 8x10-8L; 2 windows 10x16-6L; 1 window 10x12-12L; 1 door 3'0x7'0; 1 door 2'0x6'8; 1 door 2'8x7'0.

LINTELS—5 sash lintels 8x10-3L, 2—4x3 angles; 2 lintels for triples 9x13-8L, 2—4x6x⅜ angles; 2 lintels for mul. 9x13-8L, 2—4x4x5/16 angles; 3 lintels for sgle. 9x13-8L, 2—4x3x¼ angles; 2 lintels for sgle. 10x16-6L, 2—4x4x5/16 angles; 1 lintel for sgle. 10x12-12L, 2—4x4x5/16 angles; 2 lintels for sgle. 8x10-8L, 2—4x3x¼ angles; 1 lintel for door 3'0x7'0, 2—4x4x5/16 angles; 1 lintel for door 2'0x6'8, 2—4x3x¼ angle; 1 lintel for door 2'8x7'0, 2—4x4x5/16 angles; 1 lintel for icing door.

HARDWARE—5 cellar sash sets; 19 casement sets with butts; 3 sash locks; 3 sash lifts; 27 storm sash sets; 27 screen sets; 1 front door set with butts; 1 rear door set with butts; 1 side door set with butts; 1 icing door set with butts; 3 storm door sets with butts; 3 screen door sets with butts; 1 floor hinge; 2 push plates; 13 inside door sets with butts; 17 door bumpers; 3 doz. clothes hooks; 4 stair rail brackets; 80 lb. sash weights; 1 hank sash cord; 900 lb. assorted nails; 5 lb. assorted brads; 1 coal chute; for medicine cabinet: 1 pr. ornamental butts, 1 cupboard turn; for broom cabinet: 1 cupboard turn, 1 pr. ornamental butts; for kitchen cabinet: 1 set castors, 1 bin pull, 5 pr. ornamental butts, 3 cupboard turns, 2 elbow catches, 2 drawer pulls; 1 drain board bracket; for kitchen cabinet 4 drawer pulls, 4 pr. ornamental butts, 2 cupboard turns, 2 elbow catches; 30—⅜x12 bolts with washers and nuts, wall plate bolts; 15 joist anchors; 20—⅜x8'0 rods for re-enforcing; 9—½x10'0 rods for re-enforcing.

EXTERIOR PAINTING—2 gal. trim paint; ½ gal. boiled oil; ½ gal. porch ceiling; ½ gal. screen paint; ½ gal. sash color; 6 lb. putty; ½ gal. japan; 1 gal. turpentine.

INTERIOR PAINTING—9 gal. white; 6 gal. enamel; 4 gal. filler stain; 3 gal. shellac; 6 gal. varnish; 2½ gal. floor shellac; 5 gal. floor varnish; 1 gal. oil; 1 gal. japan; 1 gal. turpentine; 1 gal. alcohol; 4 doz. sheets sandpaper; 2 lb. steel wool; ½ gal. metallic paint; ½ gal. cement floor paint.

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Quantity survey for House No. 4A32, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.

Quantity Survey for House No. 5A63, Designed Especially for National Builder by the Northwestern Division of The Architects Small House Service Bureau of the United States, Inc. See Pages 42-45 Inclusive, for Design, Description and Complete Plans for This House

EXCAVATING—138 cu. yds.

BACKFILL—35 cu. yds.

FOUNDATION—If 12" concrete, 36 cu. yds. gravel, 146 sax cement; if 9" concrete, 28 cu. yds. gravel, 114 sax cement; if 12" tile, 16200 CBM tile, 13 cu. yds. mortar; if 9" tile, 12600 CBM tile, 10 cu. yds. mortar.

CEMENT FLOOR—4 cu. yds. gravel; 3 cu. yds. sand; 44 sax cement; 3 cement spatter blocks.

CHIMNEY—1200 common brick; 150 face brick; 38 lin. ft. 8x12 flue tile; 1 cu. yd. mortar; 1—8x10 cleanout door; 1—8" thimble; 1—6" thimble; 4 yds. metal lath.

LATH—9 sq. yds. metal; 8000 wood lath.

PLASTER—9 sq. yds. plaster on metal; 580 sq. yds. plaster on wood; 14 sq. yds. plaster on cement; 15 sq. yds. Keene's cement.

TILE FLOORS—30 sq. ft. ceramic tile; 29 lin. ft. cove base.

LUMBER—3—6x6-7 posts; 84 lin. ft. 2x10 girders; 56 lin. ft. 2x4 girder ribbon; 3—2x10-14 stair horses; 54 lin. ft. 2x4 basement partition plates; 16—2x4-7 basement partition studs; 180 ft. D&M basement partition sheathing; 4—2x6-6 porch joist; 4—2x6-4 porch joist girders; 4 ft. plank cleanout cover; 4—2x6-3 stoop girders; 3—2x6-6 stoop joist; 50 ft. flooring stoop and porch; 40 ft. ceiling porch; 56 lin. ft. 2x10 box sill; 23—2x10-22 first floor joist; 650 ft. com. bds. first floor subfloor; 850 ft. 13/16x1½ first floor finish floor; 3—2x10-16 headers; 2—2x10-22 doubles; 186 lin. ft. 2x4 first floor partition plates; 54—2x4-9 first floor partition studs; 3—2x10-18 stair horses; 2—2x8-14 opening headers; 300 lin. ft. 1x3 bridging; 1100 lin. ft. grounds; 56 lin. ft. 1x4 ribbon; 23—2x10-22 second floor joist; 2—2x10-14 headers; 650 ft. com. bds. second floor subfloor; 800 ft. 13/16x1½ second floor finish floor; 228 lin. ft. 2x4 second floor partition plates; 67—2x4-8 second floor partition studs; 23—2x6-22 second floor ceiling joist; 700 ft. D&M attic floor; 2—2x6-12 headers; 4—2x4-6 porch ceiling joist; 25—2x4-14 look outs; 294 lin. ft. 2x4 outside wall plates; 90—2x4-18 outside wall studs; 2000 ft. shiplap outside wall sheathing; 1800 ft. siding outside wall sheathing; 1—1x8-7 ridge rafter; 4—2x6-20 hip rafters; 40—2x4-16 rafters; 5—2x4-5 rafters; 1200 ft. com. bds. roof sheathing; 10M shingles; 25—2x4-16 scaffold and extras; 8—2x6-14 scaffold and extras; 3—2x8-16 scaffold and extras; 4—2x10-14 scaffold and extras.

MILLWORK—Frames: 7 sash 10x12-3L-1⅜; 8 window 10x12-12L-1⅜; 3 window 10x12-16L-1⅜; 2 window 9x11-12L-1⅜. **Windows:** 7 sash 10x12-3L-1⅜; 8 windows 10x12-12L-1⅜; 3 windows 10x12-16L-1⅜; 2 windows 9x11-12L-1⅜. **Storm Sash:** 7—10x12-3L-1⅛; 8—10x12-12L-1⅛; 3—10x12-16L-1⅛; 2—9x11-12L-1⅛. **Screens:** 7—10x12-3L-1⅛; 8—10x12-12L-1⅛; 3—10x12-16L-1⅛; 2—9x11-12L-1⅛. **Outside Door Frames:** 1—3'0x7'0-1¾; 1—2'8x7'0-1¾; 1 icing door fr. **Outside Doors:** 1—3'0x7'0-1¾; 1—2'8x7'0-1¾; 1 icing door. **Storm Doors:** 1—3'0x7'0-1⅛; 1—2'8x7'0-1⅛. **Screen Door:** 1—3'0x7'0-1⅛; 1—2'8x7'0-1⅛. **Outside Millwork:** 125 lin. ft. cornice; 2 lattice frames 1'8x8'6; 2 lattice frames 4'0x8'6; 1 set entrance steps; 2 porch posts; 16 lin. ft. porch facia; 16 lin. ft. porch soffit; 16 lin. ft. inside porch facia; 22 lin. ft. porch cove; 20 sq. ft. lattice work; 1 set rear steps; 2—5'0 verge boards. **Interior Doors:** 1—2'8x7'0-1¾ (No. 1102); 2—2'6x7'0-1⅜ (No. 1102); 1—2'4x7'0-1¾ (No. 1102); 5—2'6x6'8-1⅜ (No 1102); 1—2'6x6'6-1⅜ (No. 710). **Jambs:** 1—2'8x7'0; 2—2'6x7'0; 1—2'4x7'0; 5—2'6x6'8; 1—2'6x6'6; 1—7'0x7'0. **Interior Trim:** 7 sides 10x12-3L; 8 sides 10x12-12L; 3 sides 10x12-16L; 2 sides 9x11-12L; 1 side 3'0x7'0; 1 side 2'8x7'0; 1 side icing door; 2 sides 2'8x7'0; 4 sides 2'6x7'0; 2 sides 2'4x7'0; 10 sides 2'6x6'8; 1 side 2'6x6'6; 2 sides 7'0x7'0; 1—3'0 cupboard; 1—4'0 cupboard; 1—5'6 worktable; 1—1'6 cabinet; 1 flight basement stairs; 1 flight main stairs with rail; 1—3'0 table; 1—4'0 linen cabinet; 1—16" towel cabinet; 1 medicine cabinet; 1 meter cabinet; 1 utility jamb; 1 utility door; 1 utility trim; 1 scuttle door jamb and trim; 420 lin. ft. base; 420 lin. ft. base shoe; 420 lin. ft. molding; 108 lin. ft. ceiling cove; 216 lin. ft. picture molding; 16 lin. ft. closet shelving; 16 lin. ft. closet hook strip; 12 lin. ft. closet clothes poles; 24 lin. ft. chair rail; 7 lin. ft. threshold; 1 drain board. **Note:** If dining and living room trim is changed, it will affect the following items listed above: 1 door 3'0x7'0-1¾ Detail; 1 side trim 3'0x7'0; 1 door 2'4x7'0-1⅜ (No. 1102); 1 jamb 2'4x7'0; 1 side trim 2'6x7'0; 1 door 2'6x7'0-1⅜ (No. 1102); 1 jamb 2'6x7'0; 1 side trim 2'6x7'0; 1 side trim 10x12-12L; 3 side trim 10x12-16L; 108 lin. ft. ceiling cove; 108 lin. ft. base; 108 lin. ft. base shoe; 108 lin. ft. base molding; 1 china cabinet; 108 lin. ft picture molding; 1 side trim 7'0x7'0; 1 jamb 7'0x7'0; 500 ft. 13/16x1½ finish flooring.

WEATHER STRIPS—7 sash 10x12-3L; 8 windows 10x12-12L; 3 windows 10x12-16L; 2 windows 9x11-12L; 1 door 3'0x7'0; 1 door 2'8x7'0.

CAULKING—20 window frames; 2 door frames; 1 icing frame; 1 coal chute.

HARDWARE—7 cellar sash sets; 13 sash locks; 13 sash lifts; 20 storm sash sets; 20 screen sets; 1 front door set with butts; 1 rear door set with butts; 2 storm door sets; 1 floor hinge; 2 push plates; 9 inside door sets with butts; 12 door bumpers; 3 doz. clothes hooks; 4 stair rail brackets; 390 lbs. sash weights; 3 hanks sash cord; 1100 lbs. assorted nails; 6 lbs. assorted brads; 1 coal chute; for 3'0 kitchen cabinet: 2 pr. ornamental butts, 1 cupboard turn, 1 elbow catch; for 4'0 kitchen cabinet: 4 pr. ornamental butts, 2 cupboard turns; 2 elbow catches; for work table; 1 set castors, 7 drawer pulls, 2 pr. ornamental butts, 1 cupboard turn, 1 elbow catch; for linen closet: 2 pr. ornamental butts, 1 cupboard turn, 1 elbow catch, 6 drawer pulls; for towel cabinet: 2 pr. ornamental butts, 1 cupboard turn; for medicine cabinet: 1 cupboard turn, 1 pr. ornamental butts; for broom cabinet: 1 pr. ornamental butts, 1 cupboard turn; for meter cabinet: 1 cupboard turn, 1 pr. ornamental butts; 1 pr. hinges, scuttle door; 4 friction stays, utility door.

TINWORK—7 lin. ft. ridge roll; 2 finials; 64 lin. ft. hip roll; 117 lin. ft. gutter; 4 outside miters; 2 gutter ends; 4 nipples; 4 strainers; 4 elbows; 4 offsets; 30 gutter hangers; 69 lin. ft. conductor pipe; 9 conductor hooks; 1 saddle; 3 sheets sheet tin; 200 tin shingles.

INSULATION—570 sq. ft. ½" vegetable insulation or equal for roof; 1600 sq. ft. ½" vegetable insulation or equal for walls; 3 rolls felt for floors; 4 rolls felt for walls; 3 rolls felt for roof.

EXTERIOR PAINTING—14 gal. body paint; 4 gal. trim paint; 2 gal. boiled oil; 30 gal. shingle stain; ½ gal. porch paint; ½ gal. screen paint; ½ gal. sash color; 10 lbs. putty; 1 gal. turpentine.

INTERIOR PAINTING—10 gal. white; 8 gal. enamel; 4 gal. filler; 3 gal. shellac; 9 gal. varnish; 3 gal. floor shellac; 4 gal. floor varnish; 1 gal. oil; 1 gal. turpentine; 1 gal. alcohol; 4 doz. sheets sandpaper; 3 lbs. steel wool.

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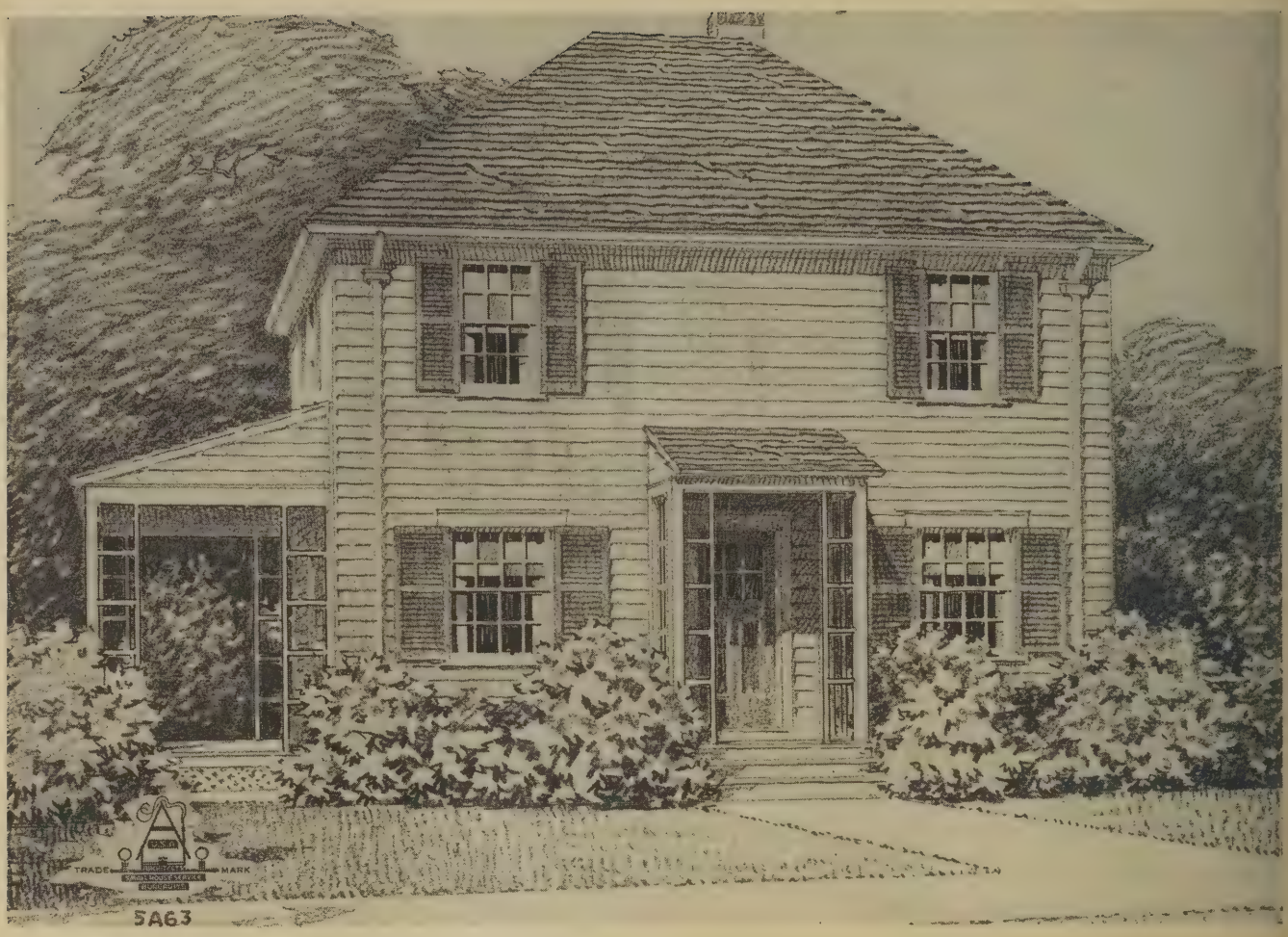

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Five Rooms With a Variety of Possibilities

House No. 5A63, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc.

THIS is a five-room, full two-story house in which economy is combined with good appearance. The design does not follow any tradition in a slavish way, but is reminiscent of the Colonial. All elements that tend to increase costs have been rigidly cut out. The joist framing is simple. There are no angles and few breaks in plan; no dormers and the roof is extremely simple. No special material is used and all material is stock that is carried everywhere.

Also the plan itself is very flexible. The frontage may be between 22 and 36 feet. The porch may be added almost anywhere and its possible positions are sketched on the drawings. The living and dining rooms may be separate or thrown together and the dining alcove may be used or omitted as the builder desires.

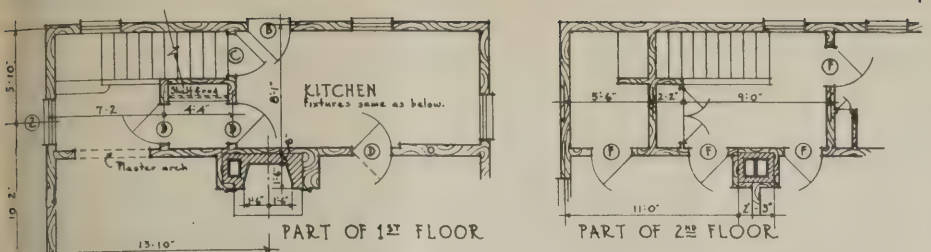
The construction is frame, with siding or shingle exterior, shingle roof, cement base course, and masonry foundations. It is designed to face south or east and should be reversed for other facings.

This is an unusual plan in the way it has been de signed to meet practically all variations and designs Working drawings include alternate details of porches The two perspectives illustrate the different facings an application of the porches, and the block plans on th next page illustrate different facings of the porch, an different positions of the fireplace, depending upo whether the house is placed with the broad side or shor side to the front.

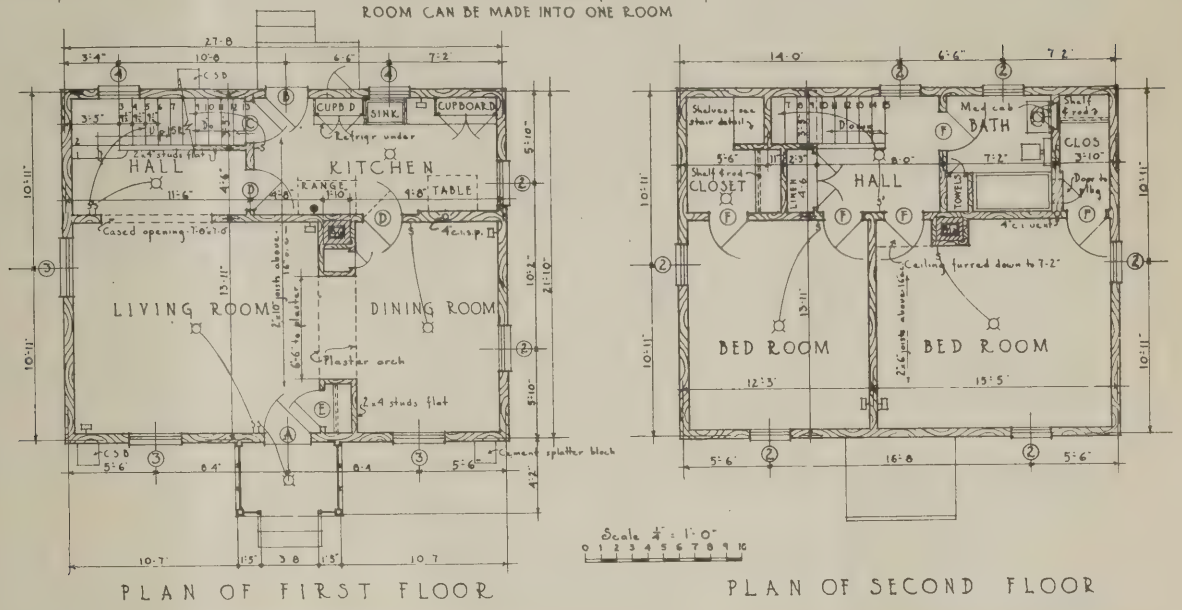
If placed with the short side to the front it will go o a thirty-foot lot, otherwise it will require a lot of abou forty feet frontage.

On the second floor there are two good bedrooms each with cross-corner ventilation and an enormou closet. There is a shelved linen closet and in the bath room a large towel closet. The basement has a well lighted laundry.

The regular price of this design is $25.50 ($13.00 t NATIONAL BUILDER subscribers).



ALTERNATE PLANS SHOWING HOW LIVING ROOM AND DINING ROOM CAN BE MADE INTO ONE ROOM

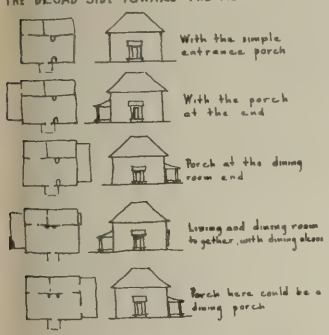


PLAN OF FIRST FLOOR

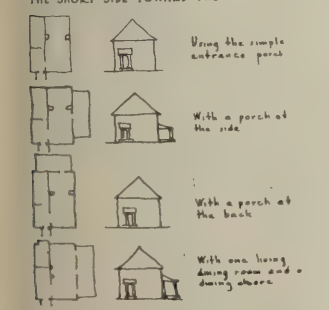
PLAN OF SECOND FLOOR

THE ELEMENTS OF THIS HOUSE MAY BE ARRANGED IN ANY OF THE COMBINATIONS INDICATED BELOW

THESE COMBINATIONS ARE POSSIBLE PLACING THE BROAD SIDE TOWARD THE FRONT


With the simple entrance porch
With the porch at the end
Porch at the dining room end
Living and dining room together with dining alcove
Porch here could be a dining porch

THESE COMBINATIONS ARE POSSIBLE PLACING THE SHORT SIDE TOWARD THE FRONT


Using the simple entrance porch
With a porch at the side
With a porch at the back
With one living dining room and a dining alcove

The dining alcove may be added to the kitchen of any of the above combinations. Also the Living Room and Dining Room may be combined in one room as shown in the alternate plan. IMPORTANT NOTE. Since any of these and possibly other combinations can be built from this set of drawings it is most important for the protection of the owner and the contractor that there be an agreement in writing as to what is to be built before the contract is signed

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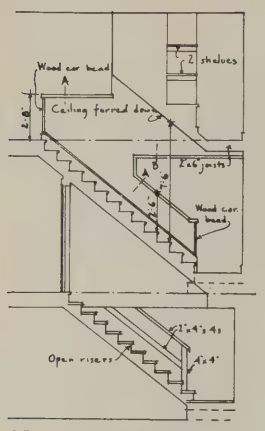
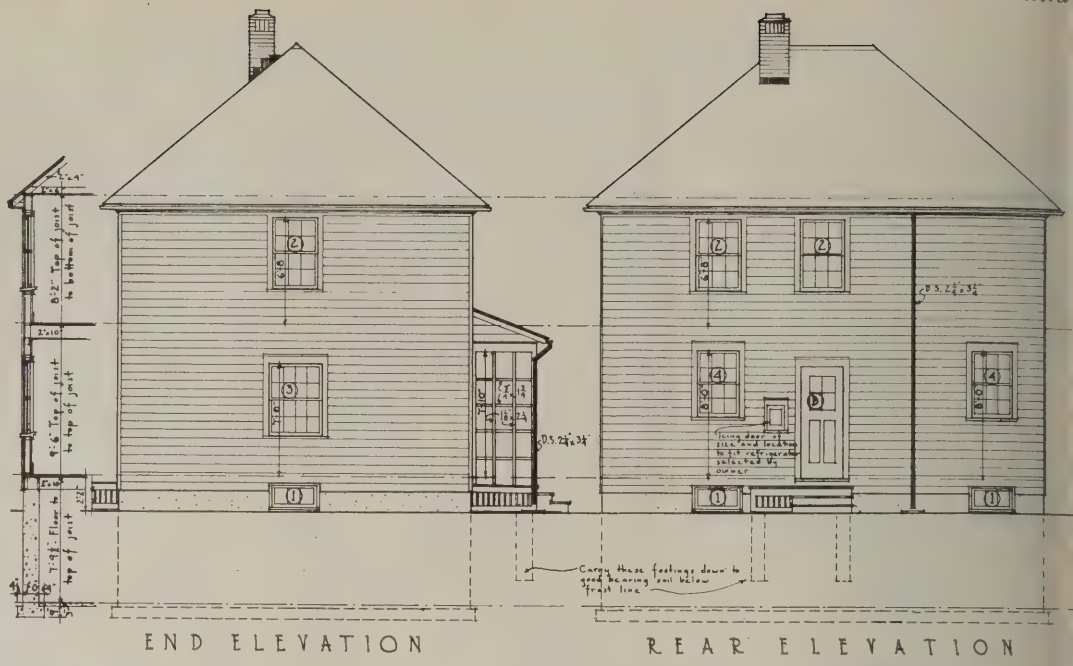
Plans, alternate perspective and suggested floor plan arrangements for House No. 5A63, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc. For quantity survey for this house see page 41



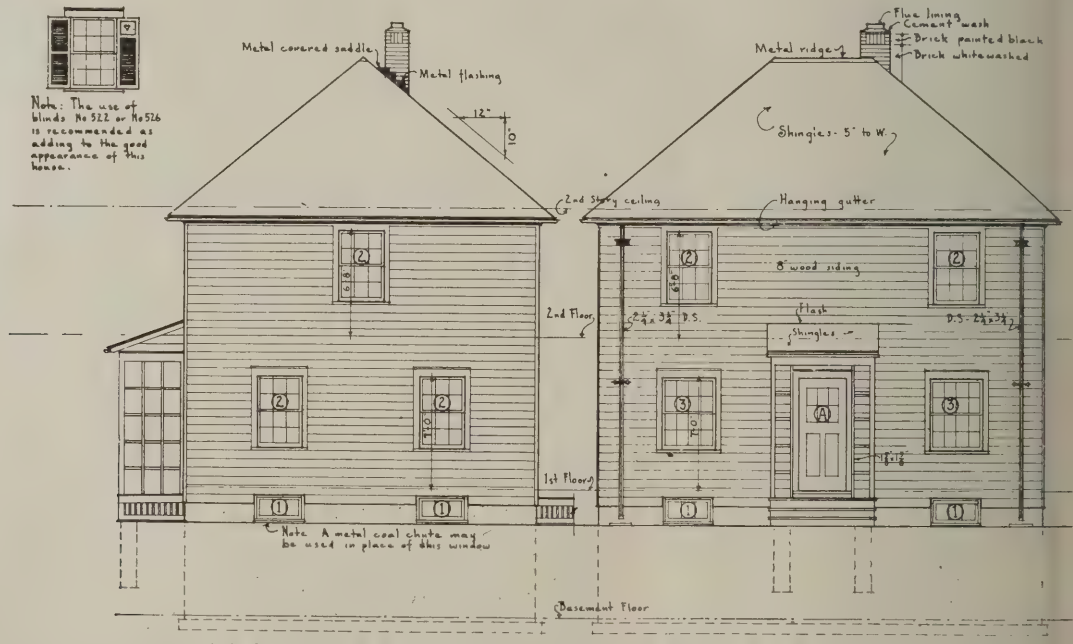
SECTION THRU STAIRWAY
Scale 3/4" = 1'-0"


Top of joist to bottom of joist
Top of joist to top of joist
Floor to top of joist
Carry these footings down to good bearing soil below frost line

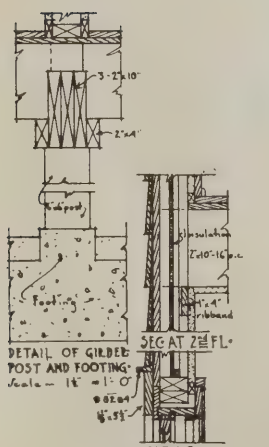
END ELEVATION REAR ELEVATION

DETAIL OF HANDRAIL CAP
Scale - 1½" = 1'-0"

Note: The use of blinds No 522 or No 526 is recommended as adding to the good appearance of this house.



END ELEVATION FRONT ELEVATION



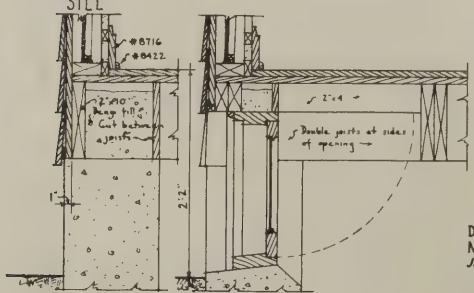
DETAIL OF GIRDER POST AND FOOTING
Scale - 1½" = 1'-0"

SECT. AT 2ND FL.

SCALE FOR DETAILS

0 3" 6" 9" 1' 2'

ONE AND ONE-HALF INCHES EQUAL ONE FOOT

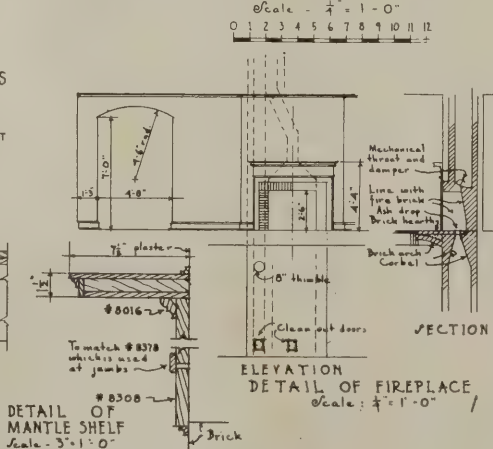


SECT. AT 1ST FLOOR AT BASEMENT WINDOW

TYPICAL WALL SECTIONS.

Scale - ½" = 1'-0"

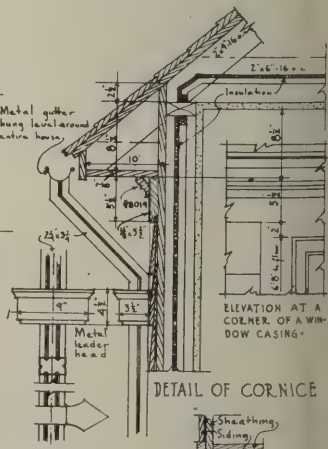
0 1 2 3 4 5 6 7 8 9 10 11 12



SECTION

ELEVATION
DETAIL OF FIREPLACE
Scale: ½" = 1'-0"

DETAIL OF MANTLE SHELF
Scale - 3" = 1'-0"



DETAIL OF CORNICE

ELEVATION AT A CORNER OF A WINDOW CASING

CORNER BOARD

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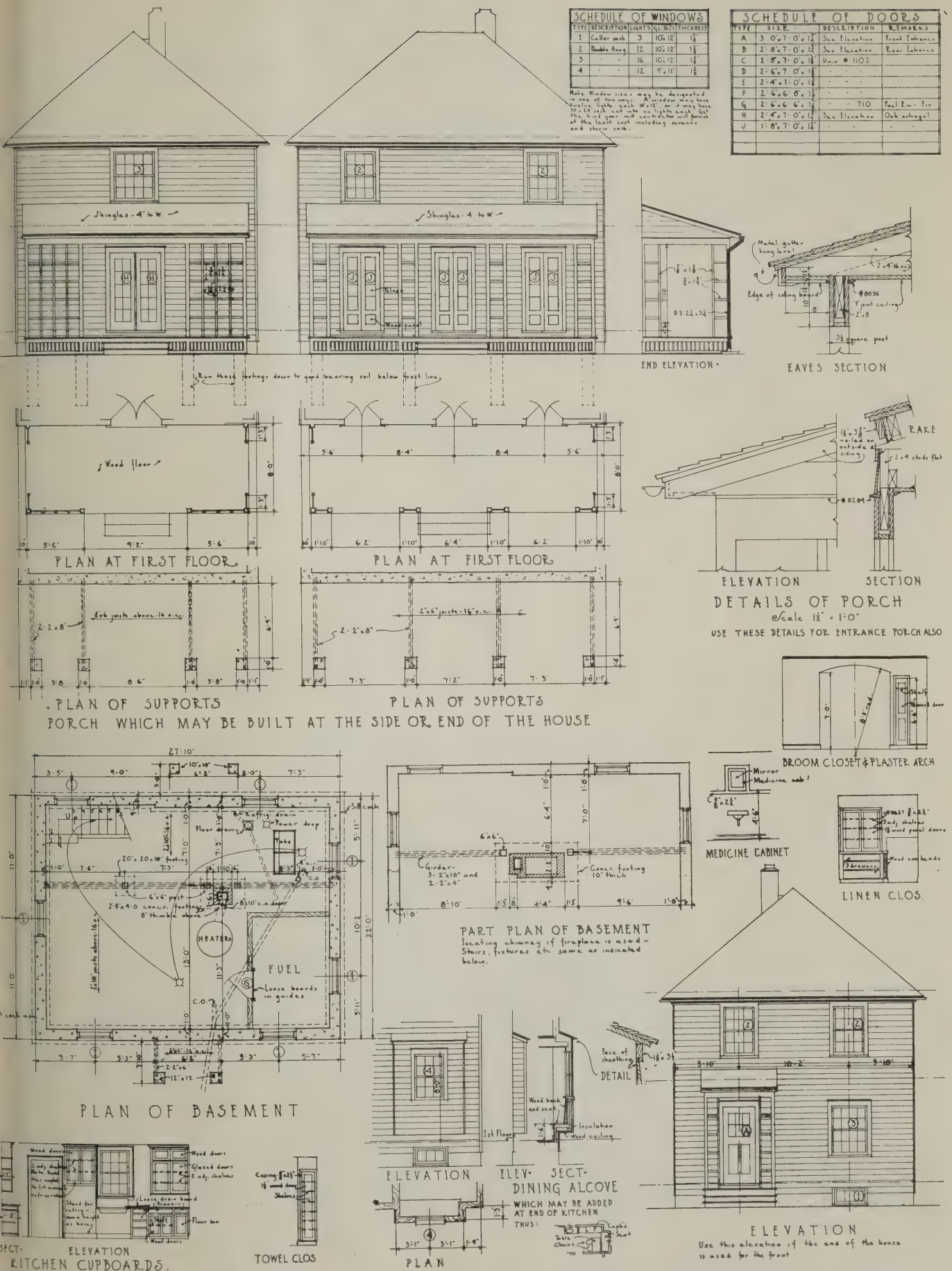
Elevations and details for House No. 5A63, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc. For quantity survey for this house see page 41


SCHEDULE OF WINDOWS
TYPE | DESCRIPTION | LIGHTS | GL SIZE | THICKNESS
1 | Caller sash | 3 | 10"x 12" | 1 1/8"
2 | Double Hung | 12 | 10"x 12" | 1 1/8"
3 | - - | 16 | 10"x 12" | 1 1/8"
4 | - - | 12 | 9"x 11" | 1 1/8"
Note: Window sizes may be designated in one of two ways: A window may have twelve lights each 8"x 12", or it may have 10 x 24 inch sash with six lights each 8x12 the kind your mill can handle will furnish at the least cost including screens and storm sash.
SCHEDULE OF DOORS
TYPE | SIZE | DESCRIPTION | REMARKS
A | 3'-0" x 7'-0" x 1 3/4" | See Elevation | Front Entrance
B | 2'-6" x 7'-0" x 1 3/8" | See Elevation | Rear Entrance
C | 2'-8" x 7'-0" x 1 3/8" | Unit # 1102 |
D | 2'-6" x 7'-0" x 1 3/8" | - - |
E | 2'-4" x 7'-0" x 1 3/8" | - - |
F | 2'-6" x 6'-8" x 1 3/8" | - - |
G | 2'-6" x 6'-6" x 1 3/8" | - 710 | Pool Rm - Fir
H | 2'-4" x 7'-0" x 1 3/8" | See Elevation | Oak astragal
J | 1'-8" x 7'-0" x 1 3/4" | - - | - -
Shingles - 4" to W.
Shingles - 4 to W
Run these footings down to good bearing soil below frost line
END ELEVATION
Metal gutter hung level
Edge of siding board
Y joint ceiling
3 1/2 square post
EAVES SECTION
Wood floor
PLAN AT FIRST FLOOR
PLAN AT FIRST FLOOR
2-2 x 8
2x6 joists above 16" o.c.
2-2"x8"
2'x6" joists 16" o.c.
PLAN OF SUPPORTS
PLAN OF SUPPORTS
RAKE
ELEVATION
SECTION
DETAILS OF PORCH
Scale 1/2" = 1'-0"
USE THESE DETAILS FOR ENTRANCE PORCH ALSO
PORCH WHICH MAY BE BUILT AT THE SIDE OR END OF THE HOUSE
BROOM CLOSET & PLASTER ARCH
Mirror
Medicine cab!
MEDICINE CABINET
LINEN CLOS.
Roofing drain
Floor drain
Sill cock
Tubs
20"x 20"x 10" footing
6"x6" post
2-8"x 9'-0" concr. footing
8" thimble above
8'-10" c.o. down
HEATER
FUEL
Loose boards in guides
C.O.
2x10 joists above 16" o.c.
2-2"x6"
12"x 12"
PLAN OF BASEMENT
Girder - 3-2"x10" and 2-2"x4"
Concr. footing 10" thick
PART PLAN OF BASEMENT
locating chimney if fireplace is used - Stairs, fixtures etc same as indicated below.
Face of sheathing
DETAIL
Wood back and seat
Insulation
Wood ceiling
1st Floor
ELEVATION
ELEV. SECT.
DINING ALCOVE
WHICH MAY BE ADDED AT END OF KITCHEN THUS:
Table
Chairs
PLAN
ELEVATION
Use this elevation if the end of the house is used for the front
Wood doors
Glazed doors
2 adj. shelves
Floor line
SECT.
ELEVATION
KITCHEN CUPBOARDS.
Casing 2 1/2"
1 1/8" wood doors
Shelves
TOWEL CLOS

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Elevations, basement plan and details for House No. 5A63, designed especially for National Builder by the Northwestern division of The Architects' Small House Service Bureau of the United States, Inc. *For quantity survey for this house see page 41*

Cutting Costs with New Construction Method

Union Memorial Hospital at Baltimore Erected Under System "M" Which Makes Possible Saving of 25 Per Cent of Cost of Original Plan

MANY a building project which has been abandoned, due to high construction costs, might have been carried out if those in charge were equipped with the foresight and ingenuity of the men who made possible the construction of the Union Memorial Hospital at Baltimore, Md. Beset with the problem of raising more money or postponing work on a structure for which an immediate need was apparent, they set to work and not only erected the building according to the original layout and elevations but also, by a new construction method called the System "M," effected a saving in cost of from 25 to 30 per cent.

The original plans called for a main building, six stories in height, with a central rear building and power house, designed according to the most modern practice in hospital structures. The design was for the usual type of wall-bearing building with steel frame and concrete floor slabs. All the steel work was carried on the outside walls and on interior brick partition walls as shown in the accompanying sketch. This plan called for a large amount of 17-in. brick corridor wall and the steel work consisted of 24-in. I-beam girders supporting 10-in. and 6-in. I-beams upon which the

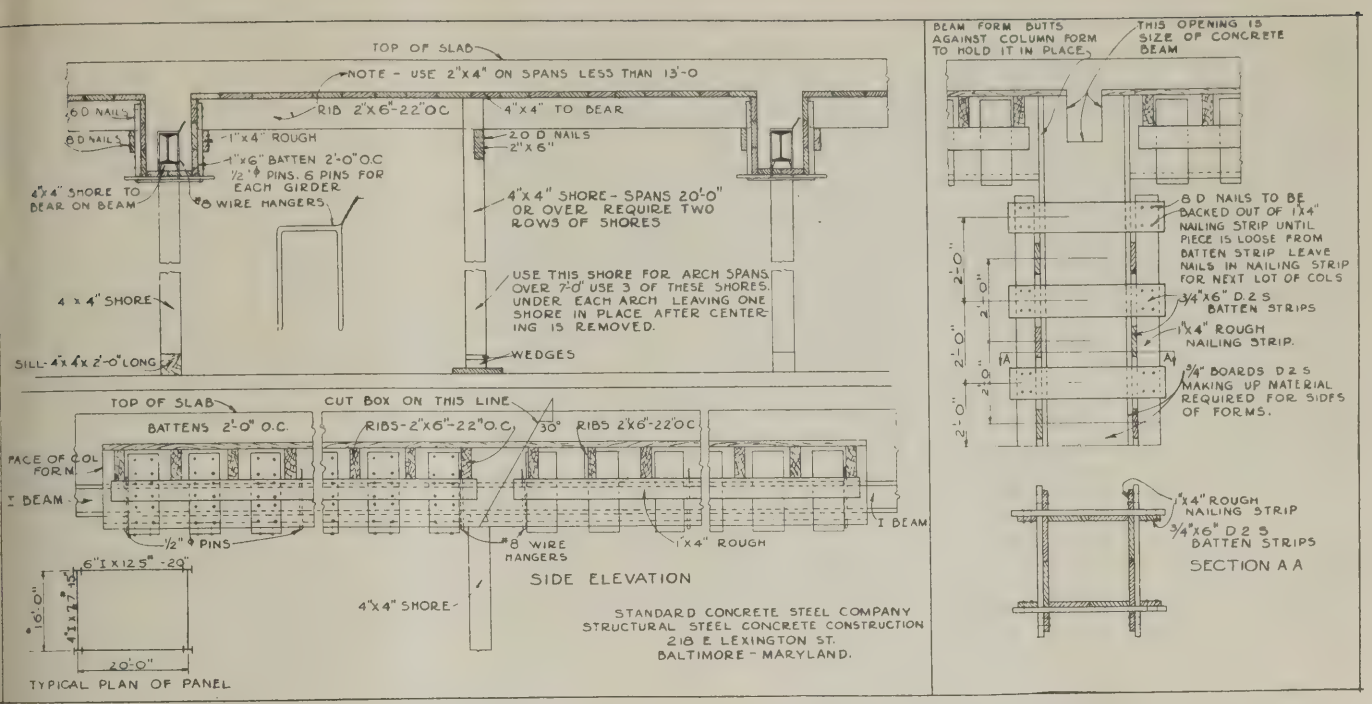
System "M" reinforcing

floor slabs were to be laid. Bids on this plan were called for but no offer received was within the amount of money available.

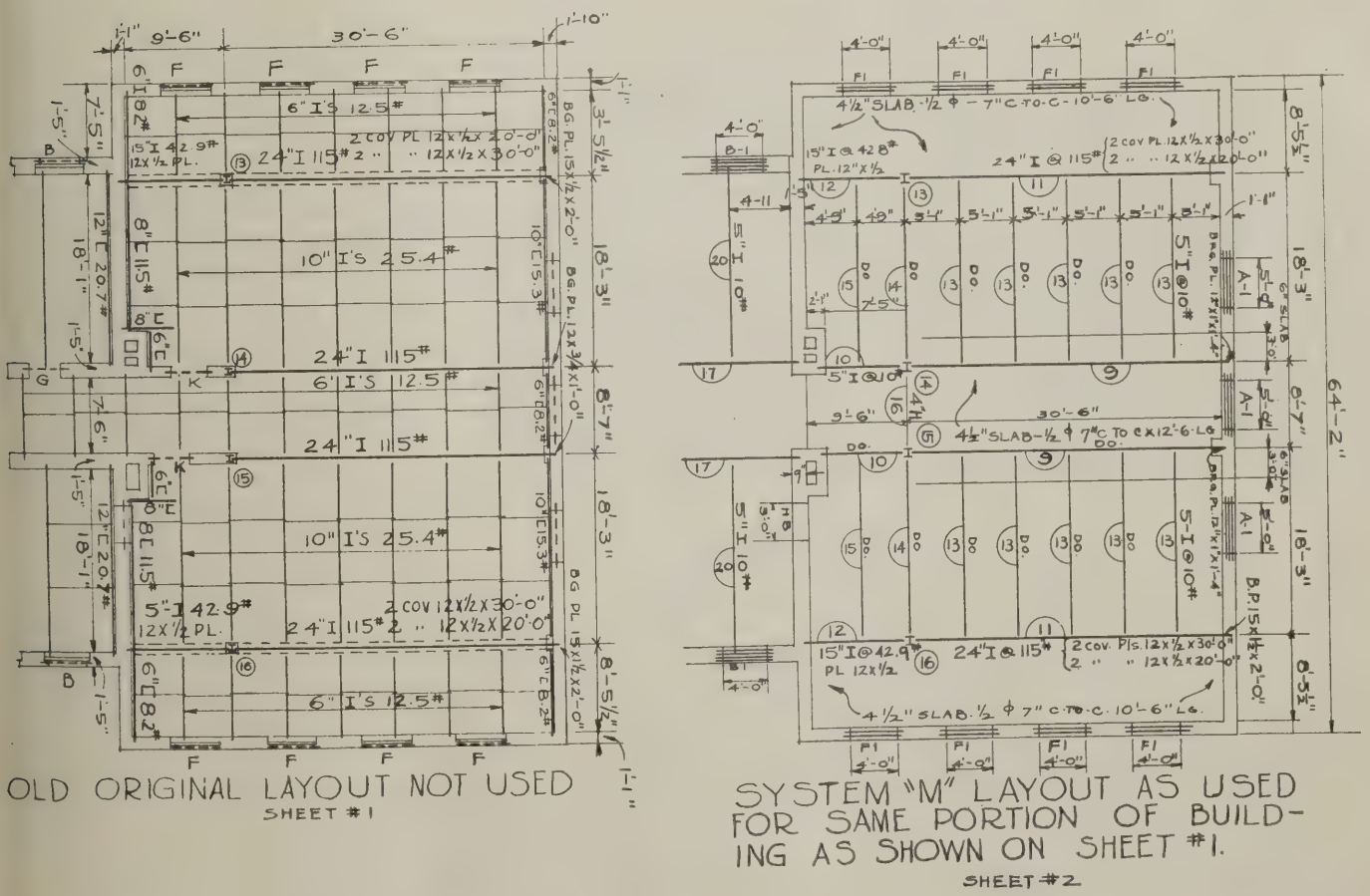
For some time the project was forced to lie in abeyance until a revised plan for a wall-bearing structure of the same floor layout and elevations was submitted by a contractor, with a bid of 25 or 30 per cent below all other bids obtained for the erection of the building under the former plans. The low bid was possible, due to the more efficient placing of the steel work and the consequent reduction in size and weight of the steel sections, the combining of the lighter structural members with concrete under the System "M," and the simplicity of the concrete form work which this form of construction made possible.

Steel columns and girders were substituted for the interior bearing walls and 4-in. terra cotta was used for partitions. In structures of this type there has been, from time to time, much discussion regarding the economy of substituting steel with terra cotta partitions for brick-bearing walls. The cost in this particular building proved conclusively that the method finally adopted was the most economical. A great amount of additional floor space was also obtained because of the narrow partition walls.

Front view of Union Memorial Hospital, Baltimore


TOP OF SLAB
NOTE - USE 2"X4" ON SPANS LESS THAN 13'-0
RIB 2"X6"-22"OC
4"X4" TO BEAR
60 NAILS
8D NAILS
1"X4" ROUGH
1"X6" BATTEN 2'-0" O.C
½" ϕ PINS. 6 PINS FOR EACH GIRDER
#8 WIRE HANGERS
2-0 D NAILS
2"X6"
4"X4" SHORE - SPANS 20'-0" OR OVER REQUIRE TWO ROWS OF SHORES
4"X4" SHORE TO BEAR ON BEAM
USE THIS SHORE FOR ARCH SPANS OVER 7'-0" USE 3 OF THESE SHORES. UNDER EACH ARCH LEAVING ONE SHORE IN PLACE AFTER CENTERING IS REMOVED.
4"X4" SHORE
SILL-4"X4"X2'-0" LONG
WEDGES
TOP OF SLAB
CUT BOX ON THIS LINE
BATTENS 2'-0" O.C.
RIBS-2"X6"-22"O.C.
30°
RIBS 2"X6"-22"OC
FACE OF COL FORM
I BEAM
½" ϕ PINS
#8 WIRE HANGERS
1"X4" ROUGH
I BEAM
SIDE ELEVATION
6"I X 12.5# -29'
16'-0"
20'-0"
TYPICAL PLAN OF PANEL
4"X4" SHORE
STANDARD CONCRETE STEEL COMPANY
STRUCTURAL STEEL CONCRETE CONSTRUCTION
218 E LEXINGTON ST.
BALTIMORE - MARYLAND.
BEAM FORM BUTTS AGAINST COLUMN FORM TO HOLD IT IN PLACE
THIS OPENING IS SIZE OF CONCRETE BEAM
8 D NAILS TO BE DRAWN OUT OF 1X4" NAILING STRIP UNTIL PIECE IS LOOSE FROM BATTEN STRIP. LEAVE NAILS IN NAILING STRIP FOR NEXT LOT OF COLS
¾"X6" D.2 S. BATTEN STRIPS
1"X4" ROUGH NAILING STRIP.
¾" BOARDS D.2 S. MAKING UP MATERIAL REQUIRED FOR SIDES OF FORMS.
1"X4" ROUGH NAILING STRIP
¾"X6" D.2 S. BATTEN STRIPS
SECTION A A

Details of formwork for concrete floor slab construction. Note method used to hold beams in place while concrete is poured



Two sketches showing the arrangement and sizes of steel beams under original and final plans. Note the difference in weight and number of the steel beams in the System "M" layout

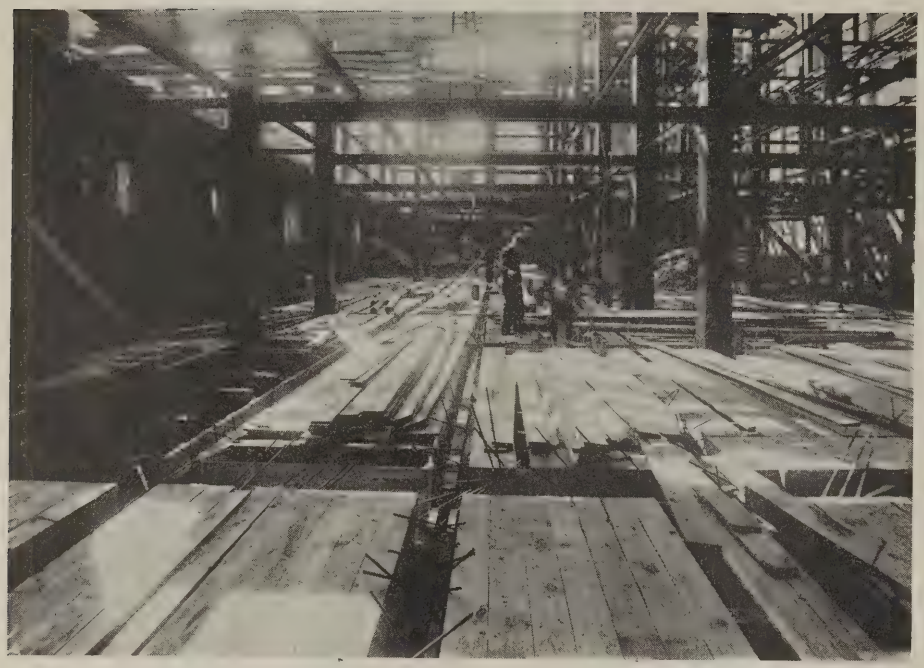


Photo by Bachrach

View showing steel arrangement and slab formwork in place. Note steel rods drawn up through beam webs and bent to fall inside of the floor slab

Rear elevation of hospital showing power-house and smoke-stack

The System "M" reinforcing, which made possible the saving in cost, has been confined almost entirely to the cities along the Eastern coast. In New York and Washington a number of large buildings have been erected under this system, the most notable of which was the enormous War Risk Insurance building. This type of construction permits the use of a light steel frame, encased in concrete and tied to the floor slabs by means of light steel rods which are drawn through holes punched in the beam webs and then bent into the slab. By means of this arrangement the load is carried by the steel frame and distributed to the columns as well as to the bearing walls. On this job about 40 per cent less steel was required than under the original plan and the volume of concrete used was reduced about 10 per cent.

The architect for the building was Joseph Evans Sperry and Van Rensselaer P. Saxe, C.E., was the engineer. The general contractors were Frainie Brothers & Haigley, whose superintendent is credited by the engineer with saying: "This building was rendered possible of erection only by the System 'M' of concrete floors and roof, in combination with structural steel of unusual light sections." The System "M" is patented.

Laying Oak Flooring

THE laying of oak flooring is not difficult. Any first-class carpenter can make a good job. Some judgment and care are necessary in order to produce the best results.

A sub-floor should be used under the 13/16, ⅜ and ½ in. thicknesses.

The sub-floor in new houses should be reasonably dry and laid diagonally. Shiplap of 6 or 8 in. width is preferred. This should not be put down too tight and should be thoroughly dried and cleaned before the oak flooring is laid.

It is well to use damp proof paper between the oak flooring and the sub-floor. The quantity required is small, and the very best quality of damp proof stock should be used. Where sound-proof results are desired a heavy deadening felt is recommended.

It is very important to leave about ½ in. space on all sides between the oak floors and the base board, to allow for expansion in event any dampness later gets into the oak flooring. This opening is covered by the quarter-round or base molding.

Oak flooring should be laid at right angles to the sub-floor in old houses. After laying and nailing three or four pieces use a short piece of hardwood 2x4 placed against the tongue and drive it up. Care should be taken in driving up ⅜-in. flooring not to break the tongue, which is fragile. Also do not drive up excessively tight.

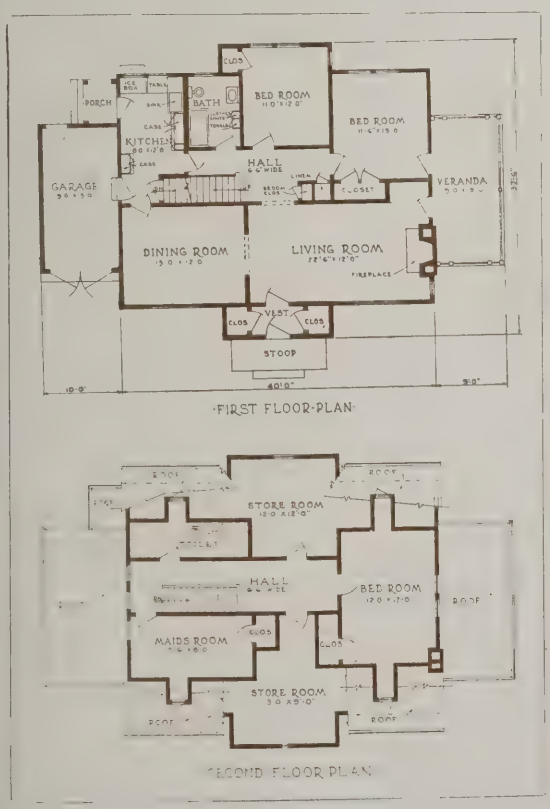
The nailing of oak flooring is very important. All tongued-and-grooved oak flooring should be blind nailed. The best floor made can be spoiled by the use of improper nails. Cement-coated nails are recommended, as this kind of nail has a holding power exceeding 100 per cent over ordinary nails. For 13/16-in. use eightpenny cement-coated flooring brads. For ⅜-in. use three-penny cement-coated finished nails. The maximum distance between nails should be:

For 13/16-in. thickness.....16 in.
For ⅜-in. thickness..... 8 in.
For ½-in. thickness.....12 in.

After the oak flooring is laid and thoroughly swept, it should be expertly scraped to insure a perfect polished surface. Scraping can be done by one of the many types of power or hand scraping machines that are generally used by contractors and carpenters. Always scrape lengthwise of the wood and not across the grain. A floor after scraping should be thoroughly gone over with No. 1½ sandpaper to obtain the best results in finishing. After this, the floor should again be swept clean, and the dust removed with a soft cloth. It is then ready for the finish.

National Builder
STYLE SHEET

All the Advantages of a Bungalow Plus Usable Space on the Second Floor



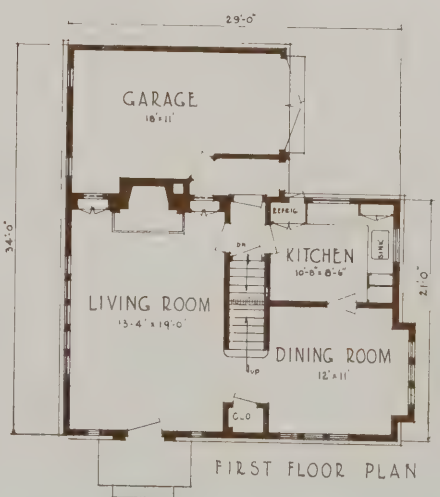
FIRST FLOOR PLAN

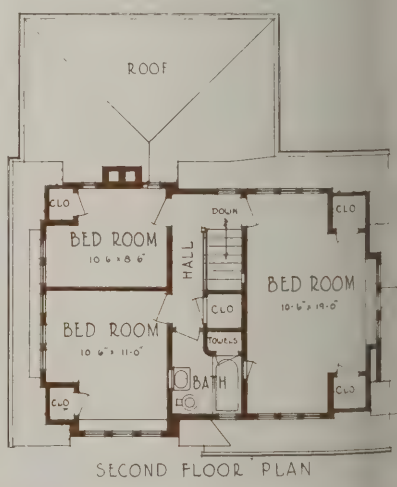
SECOND FLOOR PLAN

HOUSEWORK is easier in the one-story house than in the house of two floors—a fact which is largely responsible for the popularity of the bungalow. Here is a house, the home of Mr. J. R. Cantwell, in Madison, Wisconsin, which has all the advantages of the bungalow, yet offers, in its second story, a large emergency bedroom in addition to a maid's room, a toilet or bath and two large storage spaces. The garage is connected directly with the house. This house is particularly suited to a corner lot. Philip M. Homer, of Madison, was the architect.

A Design and Plan That Prove That a "Small" House Can Be as Distinctive as a Large One

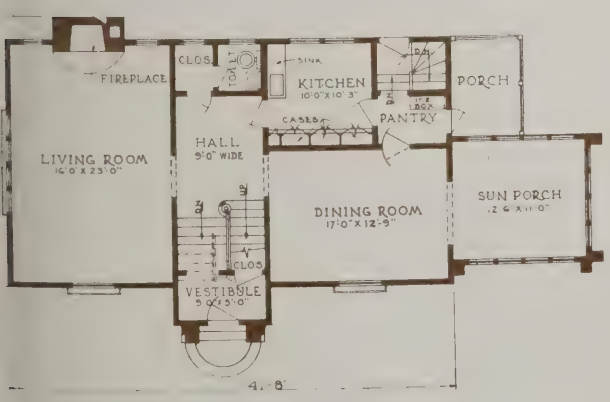
THIS is not a large house, in spite of its attractive appearance. It is only 29 by 34 over all, and that includes a garage! Yet the plan shows an unusually large living room, a big bedroom and other rooms of sufficient size for the ordinary family. It is because there is practically no hall space that so much house for the money is obtained. The location and accessibility of the garage make it an attractive feature, particularly when the lot is shallow. The half timber work, the brick arched doorway and foundation and the ornamental downspout add a touch of distinction to the exterior not often found, unfortunately, in small houses. Credit for this plan and design is due Messrs. Vorse, Kraetsch & Kraetsch, architects, Des Moines, Iowa, who designed the house for Mr. Chester Cunningham, of that city. It is an example of the splendid small house work done by this firm, in which they seem to possess unusual ability.



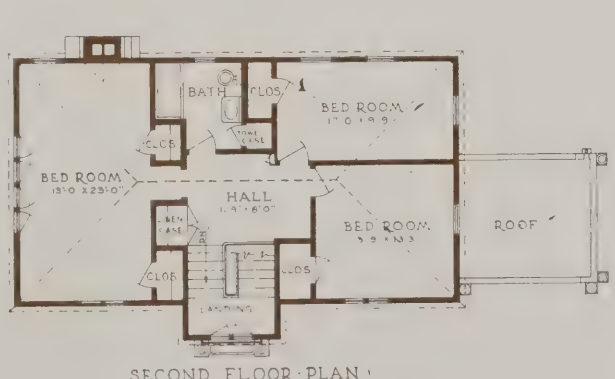


The Italian Style Adapted to a Six Room Plan With a Sun Porch Addition

SOME of the characteristic details of the Italian style are seen in this attractive house, which is the home of Mr. Stanley Balhatchet in Oak Park, Illinois. E. Norman Brydges, Chicago, was the architect and the Joseph E. Jones Company, the builders. The design is a pleasant relief from the ordinary square-type of house which has been built too frequently in recent years. The stairway is placed in an unusual position in this house, making a large hall on each floor. The large bedrooms are a noteworthy feature.

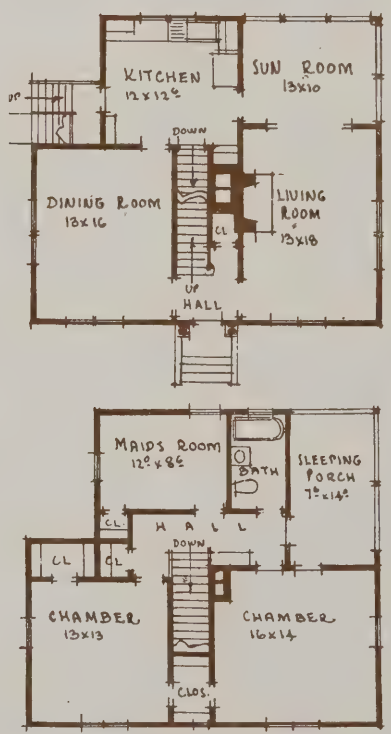


FIRST FLOOR PLAN



SECOND FLOOR PLAN

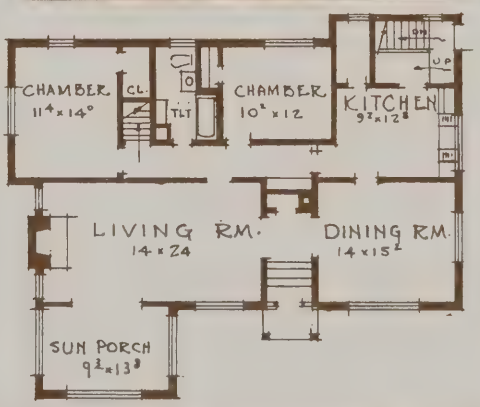
A Sun Room and Sleeping Porch Are an Integral Part of This Colonial Design



HERE is a simple, tasteful solution of the problem of the six-room house with sun room and sleeping porch. It was designed by Scott C. Dyer, architect, Chicago, for Mr. Perry L. Hole, and was built in River Forest, Illinois. Below is a view of the living room, looking toward the sun room.

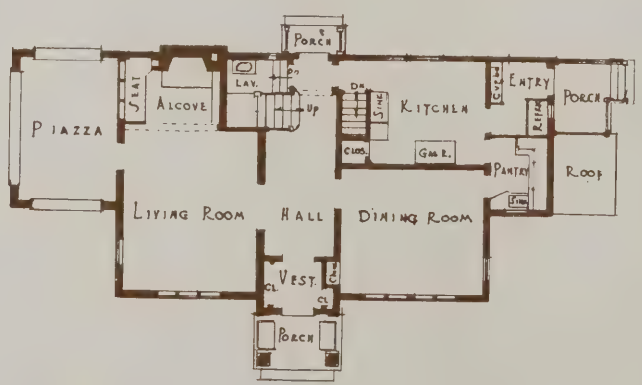
A Colonial Bungalow in Brick

RED face brick and red tile roof, with white trim, have been effectively employed in this house for Mrs. Louise Cervenka, in Riverside, Illinois, by Joseph J. Nadherny, architect.

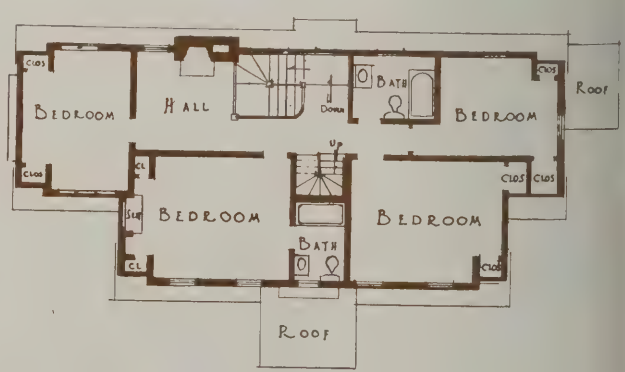


A Popular Type of House With Two Bathrooms, Four Bedrooms and Two Fireplace Alcoves

IN many of the original old Dutch Colonial houses the second story slightly overhung the first, and that is an interesting feature of this design, the home of Mr. Roland H. Boutwell, in Winchester, Massachusetts. The house was designed by Adden & Parker, architects, Boston. Note the convenient arrangement of the rooms. The stairway is of particular interest. It ends on the second floor in a large hall with a fireplace which makes an upstairs living room of the hall. There are two baths, one connected with the owner's bedroom only. The bedroom over the enclosed piazza is like a sleeping porch because of its many windows. An attic is reached by a stairway off the hall.



·FIRST FLOOR PLAN·



·SECOND·FLOOR·PLAN·

A Beautiful Two-Family House in Kohler, Wisconsin, Which is Part of an Attractive Group

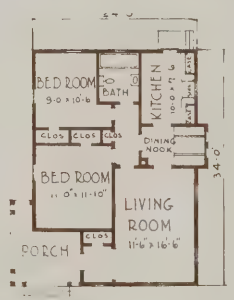
'HERE is an old world charm about this two-family house ıich suggests the cottages of d England. The design is one a large number by Brust & ıilipp, architects, Milwaukee, ıich have been built in recent ars in Kohler, Wisconsin. The use is in the English style as en in the steep roof, the closely opped gables with rake mold, e oriel or bay windows, and the ıcco with rough cast finish.

A two-family house permits an attractive treatment of the exterior because it provides long, horizontal lines which give that restful appearance desirable in residential buildings. In this case it also effects economies in construction because of the common wall between the two houses.

The floor plan is of unusual arrangement inasmuch as the house is built on a court and there are two front entrances. The design presents an attractive appearance on both sides.

The sinks for the kitchens utilize the same water pipes which also serve the two bathrooms. There are three bedrooms in each house, the two main chambers having commodious closets.

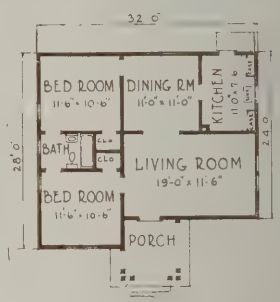
Here is a house that should appeal to the family wishing not only to own its own home but also to have an income-producing property.



Plan for house above

Two Kansas Bungalows With Good Plans

THE bungalow which is the most attractive is the one with the fewest frills and ornaments in its design. Here are two one-story houses deserving of consideration because of their simplicity and good proportions. They were built by John C. McNaghten and Sons in Hutchinson, Kansas, and are representative of the work of these builders, who operate on a large scale.



Plan for house below

Interior Decoration as an Aid to Saleability

By Edward Stratton Holloway
Author of "The Practical Book of Furnishing the Small House and Apartment"

If exterior attractiveness adds to the saleability of the house, an interesting interior (where its occupants will themselves live) may well "clinch the bargain." It is here that interior decoration comes to our aid. That phrase has been extended to include the entire furnishing of premises, but its original meaning was doubtless the decoration of the interior shell of the house itself; and, as no furnishing can be satisfactory that is not based upon a satisfactory background, it is this background which demands our first attention.

The interior treatment of the average small house not specially designed by a professional architect at considerable expense, but erected by the contracting-builder either for a client or for the open market, is often tiresomely uniform, yet little is required to render such a dwelling attractive and "different" and at an expense so small that it will many times be repaid in selling results and in the price to be realized.

The Practical Point of View

On looking at the matter in a common-sense way it is plain that what is done should be such as to please the possible purchaser or client, and it is to be remembered that many of these are young married people who have had greater advantages than their elders and who, from different sources, have absorbed a considerable degree of taste and culture. They may not always themselves be able to originate, but we may be sure they will appreciate good surroundings when presented. Vulgar and tawdry effects should therefore strictly be avoided.

When a building operation comprises a number of houses it will be an excellent plan to finish two or three of them in different manners, so that purchasers may have a choice of methods and color schemes; and this choice will act as a guide for future efforts.

As the small house should be kept cheerful, it is evident that heavy, dark wall surfaces are taboo, particularly as these also apparently decrease the size of the rooms. The walls should remain a background and be unobtrusive, but this by no means implies that they should be without character. The builder being naturally ignorant of what furnishings will eventually occupy the rooms, it is likewise plain that what he does would better be of a character that will properly accompany most furnishings, and so when color is used it should be in the direction of tones and tints rather than in positive hues. And such matters cannot be trusted to the taste of the average house-painter; the builder himself should select tints and superintend the work. It is by no means difficult—there are at present many excellent brands of ready-mixed paint and other wall preparations, so that a desired shade can usually be found; if not, it may readily be mixed. The builder may furthermore consider whether to give special treatment to all the walls of the house or only to those of hall, living room and dining room.

We may now take up a number of differing unhackneyed methods in the way of interior decoration, postponing papering to another occasion. Several of these suggestions will probably be new to many builders.

Paneling by Applied Moldings

Actual paneling is one of the fine interior finishes and gives most attractive results, but it is too expensive for the class of homes we are considering and excellent reasonably priced results may be obtained by the use of moldings directly applied to the wall, the entire surface being then painted or enameled (see Fig. 1). The moldings and labor cost very little and no further care is needed beyond seeing that the wall is evenly laid, so that the moldings will fit snugly to it without open spaces. Builders frequently first cover the wall with canvas, and this makes very close joining, but it is not at all necessary.

These means are very simple, yet it is needless to say that the future occupants will be proud of their paneled walls.

All paneling should carefully be laid out as regards the spaces to be occupied, the relations of the panels to the margins around them, and the style and width of the moldings. The proportions may easily be tried on the wall itself with a bit of charcoal.

Now let us consider the matter of color. Such walls may, of course, be entirely in white (in these articles "white" includes oyster-and-cream-white) buff, or gray, and these are always safe; but tasteful combinations exist as well. With quiet yellow walls the moldings may be of pinkish flesh-tint, or a light gray-blue, or green. Fawn color, or French gray, or putty gray walls, with gray-blue moldings, are all good, and so are buff walls with moldings of soft, quiet orange. Pale green or putty walls

Fig. 1—A simple but effective paneling easily provided by the use of applied moldings. C. A. Zeigler, architect, Philadelphia

Fig. 2—Flat strips applied to the wall and painted. Shirley B. Wainwright, interior architect, London

with white moldings and woodwork are of beautiful refinement.

In any case the inside of the panels may either be of the color of the walls or of the moldings—the latter plan usually giving a greater expanse of the stronger color.

With any such combinations the woodwork may be white, or it may be painted the color of the moldings if the builder does not feel that the latter would give too much color for the tastes of his clients.

A wainscot can be effected with equal ease. A projecting molding is run around the room and small panels applied below. Hall and dining room may have a wainscot, while the living room is paneled, provided the same coloring is used in both cases.

Even the simplest means often secure good results—a paneled overmantel with walls plain except for a picture molding set down 12 or 14 inches, is an example.

The Use of Flat Strips

This method is still less expensive than the use of moldings and it affords novel results of less formal character. The strips are applied directly to the wall in the same manner as the moldings. The mode is considerably practiced by the new English interior architects, and original designs by Shirley Wainwright, of London, are through his kindness reproduced in Figs. 2, 3 and 4.

For such purposes as we are considering it would be better that the overmantel in Fig. 2 should remain plain. These three drawings will be suggestive of other effects that may be originated by the builder.

One tone for the entire work may be used, the projections affording the desired relief and ornament, or such colorings as those mentioned may be chosen. Where such walls are specially designed for clients the coloring is often quite strong—in Fig. 2 the cornice and baseboard are black, the strips blue, and the walls fawn. In Fig. 3 the strips are green on a gray wall, and the cornice and base black. It will be noted that in Fig. 3 there is a canopy effect, a space of wall with small designs appearing above the top rail. Fig. 4 shows the use of strips above woodwork, but the same general result could be obtained by painting the lower wall, rails and strips. As no great quantity of the upper wall appears this might be of rose, the remainder being painted gray. This could be used in a dining room where the remaining rooms were in gray with moldings or bands in rose.

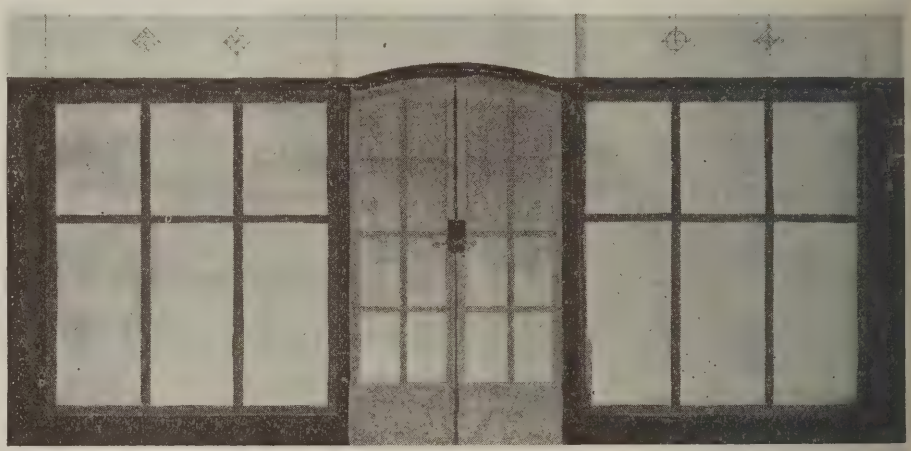


Fig. 3—A flat-stripped wall and French doors. Shirley B. Wainwright, interior architect, London

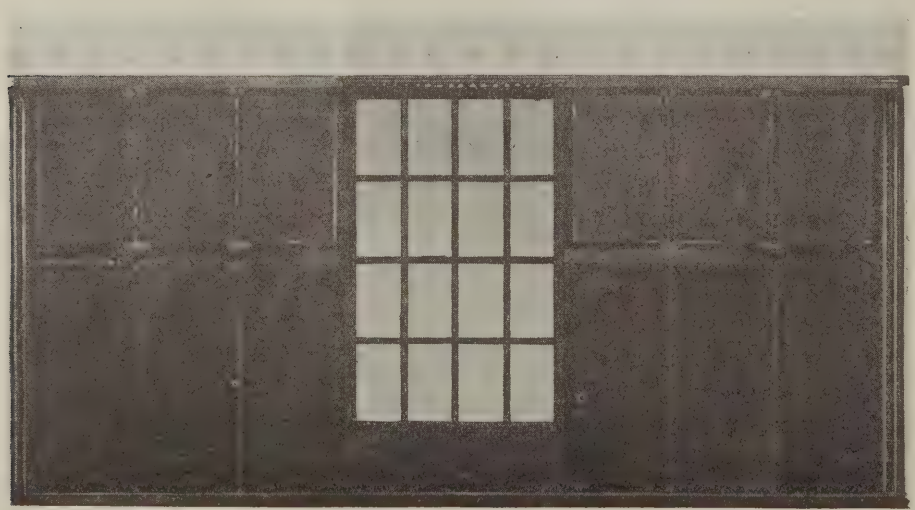


Fig. 4—The use of strips above woodwork on a painted base. Shirley B. Wainwright, interior architect, London

Painted Panels or Strip Effects

That this very simple process affords attractive walls will be seen by Fig. 5, designed by the writer for "The Practical Book of Furnishing the Small House and Apartment." Here the walls are of warm gray, the broader band being of rose and the narrow one of black. The cornice band is also black. Buff and black, buff and blue, blue and black, mulberry and green, green and black, are some other combinations of lines that may be used on neutrally tinted walls. A variation would be a broader band with the inside line set closer to the band. Good oil paint is the best medium for this purpose, but water paint or water paint bands on a wallpaper background are possible.

Any of the strip effects may be carried out in the same manner.

Attention is called to the four views of the charming little cottage room shown in

Fig. 6 and designed by Mr. Hall Thorpe of London, who has recently, and with much applause at his success, decorated some of the coaches of the Underground Railway in that city. In this room the walls are putty gray, the baseboard and upper wall white, and the floor, the picture rail and the band above baseboard, around door, and edging the mantel shelf of a gray-blue. An alternative scheme shows buff walls, yellow lines, and hardwood, or painted brown, or brown linoleum floor. It is worth mentioning that the pictures are engaging color prints of flower subjects designed by Mr. Thorpe and for sale in this country by Messrs. Brown-Robertson Company, 415 Madison Avenue, New York City.

Another smart canopy effect would be white woodwork, gray wall, black band above baseboard and black picture rail, with ceiling and upper wall of pale gray-blue. Canopies are not advisable if the ceilings are too low. It should also be remarked that, in all these decorations, cold and greenish shades of blue are to be avoided as apt to clash with the fabrics used in furnishing. A rather warm tone of gray-blue is best.

Stencil Effects

In Fig. 4 a stencil design above the woodwork will be observed. Mr. Wainwright has used such stenciling alone to great advantage. A picture rail is run around the room at the height of the doors and the design is stenciled upon the wall quite close under the rail, at the sides of the doors and above the baseboard, thus making a complete panel of the wall spaces. Nothing could be easier, but the builder has only to experiment with one such room to realize its attraction. As the amount of decoration is so small, stronger colors may be used—a rather deep blue, or mulberry, or rose, or green, on a gray wall, or an orange or yellow on a buff ground are examples. Where employed in this manner the stencil designs should be set closer together than in Fig. 4, so as to give a more continuous line.

And, again, such designs may be run around the top of the room only, and, say, three inches below a picture rail. They should then be of rather larger size and set further apart—the distance between the squares being somewhat greater than their width. This *avoids* the continuous line and a border appearance, substituting a specially designed effect.

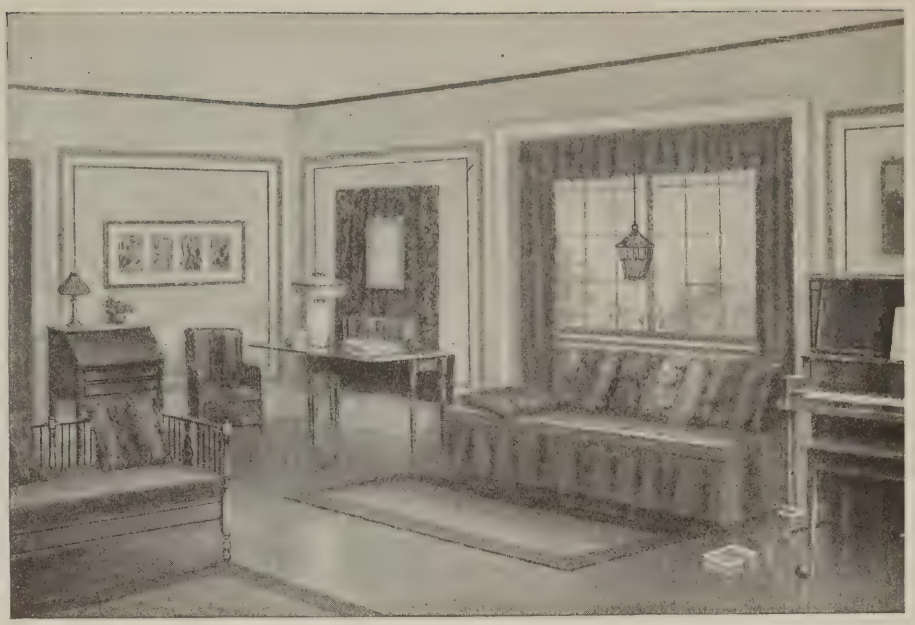


Fig. 5—A living room with panels of bands of color painted on the wall. Designed by the author, courtesy of J. B. Lippincott Company

Ceilings

The rule is that ceilings should not be darker than the side walls but as light or lighter. If walls are white, or light gray, or cream, the same may be used upon the ceilings; if darker in tone than the ceiling they may be a lighter tint of the same tone or of oyster or cream-white.

Floors

The usual floor for the small house is hardwood, or else wood stained and protected by one of the reliable well-known brands of floor-varnish.

A novelty in the contractor-built house would be the smart polished black floor—secured by using Nigrosine, which penetrates deeply, well covered with varnish. These floors and those of dark gray (painted and varnished) both give fine results and make excellent backgrounds for rugs and furniture.

If in one of his houses there is a small hall, the builder might experiment by finishing it as follows: Nigrosine black polished floor, oyster-white woodwork, warm gray wall, with rose and black or gray-blue and black painted-band paneling, and oyster-white ceiling. He could then explain that the remaining lower room would be completed in the same manner, the upper rooms omitting the bands for variety's sake.

In Colonial bedrooms floors of dark blue, or green, or yellow are sometimes used.

Good linoleum cemented down over felt paper is an excellent floor material. One of the manufacturers has tried Valspar as an additional protector of its surface with satisfactory results. Tile effects may be employed in halls, dining rooms, and bathrooms. For other rooms the pattern resembling the hardwood floor is preferable.

With all due modesty on the part of the writer he believes that if this collection of suggestions is well studied by the builder and some of the methods tastefully carried out in sample houses, he will find them money-makers indeed. But the builder must not try *diverse* methods in the one house—if anything demands consistency of treatment it is the small house or apartment.

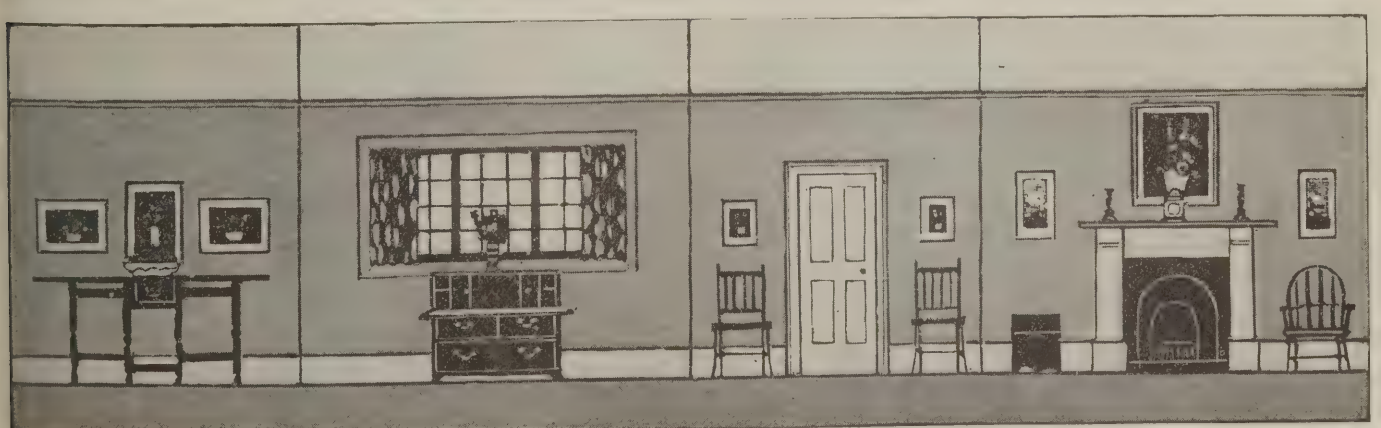
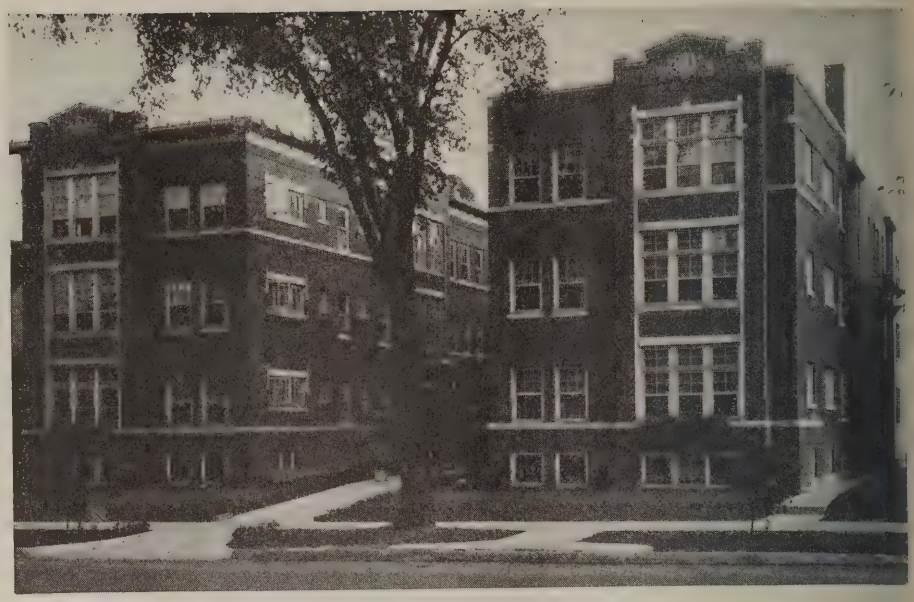


Fig. 6—Four sides of a cottage room with painted walls. Hall Thorpe, interior architect, London

Two Separate Apartment Buildings That Look Like One

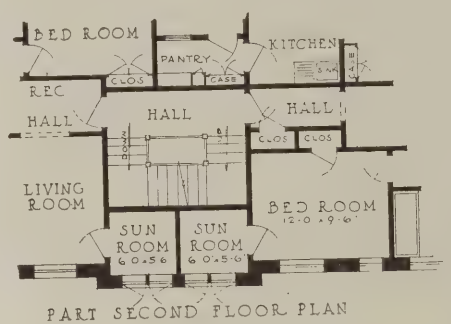


The Kalt Apartments, in Milwaukee, Wisconsin. Martin Tullgren & Sons, architects

SOMETIMES things go along as planned and sometimes they do not. When everything goes along as scheduled there is little need for the exercise of any but ordinary ingenuity, but when circumstances are such as to interfere with well laid plans, emergency measures may be necessary in order to keep things running.

Take, for instance, the case of Mr. Joseph B. Kalt of Milwaukee, Wisconsin. He owned a lot on Grand Avenue and planned to build on it and the lot adjoining, a large apartment building. Negotiations for the adjacent lot were held up for some reason or other and so the program was halted for a time. The empty lot which Mr. Kalt owned was producing nothing in the way of rentals, so rather than hold the ground until the adjacent site could be bought, a single building, which for all practical purposes is the same as one wing of a court building, was erected, and when the next lot was finally bought, a duplicate of the first building, with the plan reversed, was built. The two buildings have practically the same appearance as a court building except that they are not joined in the rear.

Light brown face brick with cut stone trim were used for the front, and the courtway and the window sash were painted white. The rear and side walls are common brick. An interesting feature of this building is the fireproof rear entrances. The main support for the rear porches is formed by rolled steel columns which rest upon concrete piers. To these columns are fastened the steel beams which form the platform supports. The stairs and railings are also steel and all platforms are concrete. This makes an absolutely fire-proof rear exit which can be used as a fire escape in time of need. In the illustration showing the rear porch, the black line running upward along the wall on one side of the chimney is an electric conduit which encloses the wires for the rear porch lights. Notice that a rear porch light is located on each landing, thus providing good illumination at night. On top of the chimney is fastened a coarse-wire cage. This cage prevents flying sparks from issuing out of the chimney and endangering neighboring property.

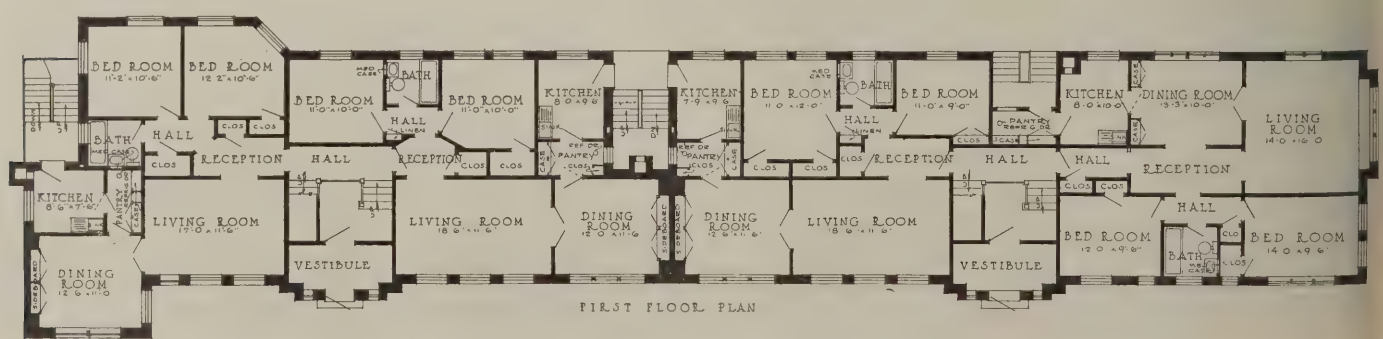


PART SECOND FLOOR PLAN

The stair well which is used to provide a rear entrance for the apartments in the center of the building is entirely shut off from the rest of the building by a brick wall. It also is built of steel and concrete and forms a good fire exit since the brick wall shuts it off from the rest of the building.

Each building contains 12 five-room and bath apartments, each of which consists of a living room, dining room, kitchen, bath, and two bedrooms. An interesting feature of the plan is the location of the kitchen, pantry and dining room. The pantry has been placed, except in the front apartment, between the kitchen and the dining room. Thus it may be used when serving, and inasmuch as it separates the kitchen and dining room, no cooking odors are apt to creep into the living rooms when food is being prepared. The dining rooms open into the living rooms, but the two rooms may be shut off from one another by the French doors which close the opening between them.

The second and third floor plans differ slightly from the first floor plan, due to the fact that the part of the stair hall used on the first floor for the vestibule is available on the two upper floors for living space.



FIRST FLOOR PLAN

Typical floor plan showing the five-room apartments

The Kalt Apartments, Grand Avenue Milwaukee, Wisconsin

The two units are separate buildings but present the appearance of a court apartment building

The small insert above the first floor plan shows how this space has been utilized on the other two floors by turning it into a small sun porch for each adjacent apartment.

Plenty of closet room has been provided for each apartment and a closet for guests' clothes is located in each reception hall. A notable feature of this plan is the fact that little floor space has been wasted in halls and vestibules.

The rooms, as will be seen from a study of the plan, are all of good size and all conveniently arranged. Each apartment has at least two rooms opening on the court, thus insuring light and sunshine, two requisites for the good health of the occupants.

Garbage incinerators are located in the chimneys

Two Herbert boilers and a Herbert water heater take care of the heating requirements of both buildings and, as an added convenience, an Atwood vacuum cleaner is located in the basement. This single vacuum plant serves several outlets located at different points in the building. Kerner garbage incinerators, located in all chimneys, furnish a solution of the garbage problem.

A close inspection of the illustration showing the two buildings will reveal the fact that a slight difference exists between the two buildings at the top. The first building was erected with a rather heavy cornice, but in the second building the cornice was omitted and a stone coping substituted, thus effecting a considerable saving in the cost. The difference is hardly noticeable from the street.

Martin Tullgren & Sons, of Milwaukee, were the architects.

The rear stairways are of steel and serve as a fire escape in emergency

One unit of the buildings, unconnected in any way with the other unit

Pioneering in "Stone-Tone" Stucco in Portland, Oregon

By E. G. Peterson

Model house of "stone-tone" stucco at Home Beautiful Exposition, Portland, Oregon

AT the Home Beautiful Exposition in Portland, Oregon, last spring, one exhibit attracted much attention by its unique nature. It was a distinctive miniature bungalow, complete to the porte-cochere and the green lawn. The exterior was stucco with a pebbled or stone-dash finish. It was the property of the Stone-Tone Stucco Company, and is illustrated in this article.

This company has done pioneer work in the Pacific Northwest in the construction of buildings of magnesite stucco, with what they term the stone-tone finish, and has succeeded in establishing its business on a permanent basis despite many obstacles.

Late in the summer of 1921 William Frese, and J. A. Wiley organized a partnership; in February, 1923, they incorporated as the Stone-Tone Stucco Company. Mr. Wiley came to Portland from Iowa, where he had worked with magnesite stucco since 1915. He knew its many advantages, and believed that with his experience he could "sell" it to Oregon and the neighboring states, and he infected Mr. Frese with his enthusiasm.

But the partners faced the usual hard conditions surrounding pioneer endeavors. In the first place, this is a lumber country, and in 1921 lumber was rather low in price. By comparison, stucco seemed prohibitive. Then, there were no sample houses nearer than San Francisco, and people are reluctant when they put their good money into a home to "take a chance" with material of which they have seen only small samples, and which has never been tested out in their own section. Let it be remarked in passing that the Northwest is conservative, and not given to fads of any sort.

There was no factory on the coast. Therefore all material must be shipped from the East, and freight rates were exceedingly high.

So the Stone-Tone Stucco Company not only encountered adverse physical conditions, but had to batter down a deep-rooted popular prejudice, and nothing is harder. The first year they got a chance at only eleven jobs, surely enough to discourage anybody. But it didn't them, for they realized that these buildings constituted test cases, and confidently expected them to pass the test. Architects, builders, and individuals, watched with eagle eyes the houses already erected. A woman who had the temerity to build one said that almost every day the first year she lived in it people were there looking at it, walking around it, and probably—waiting to see cracks appear!

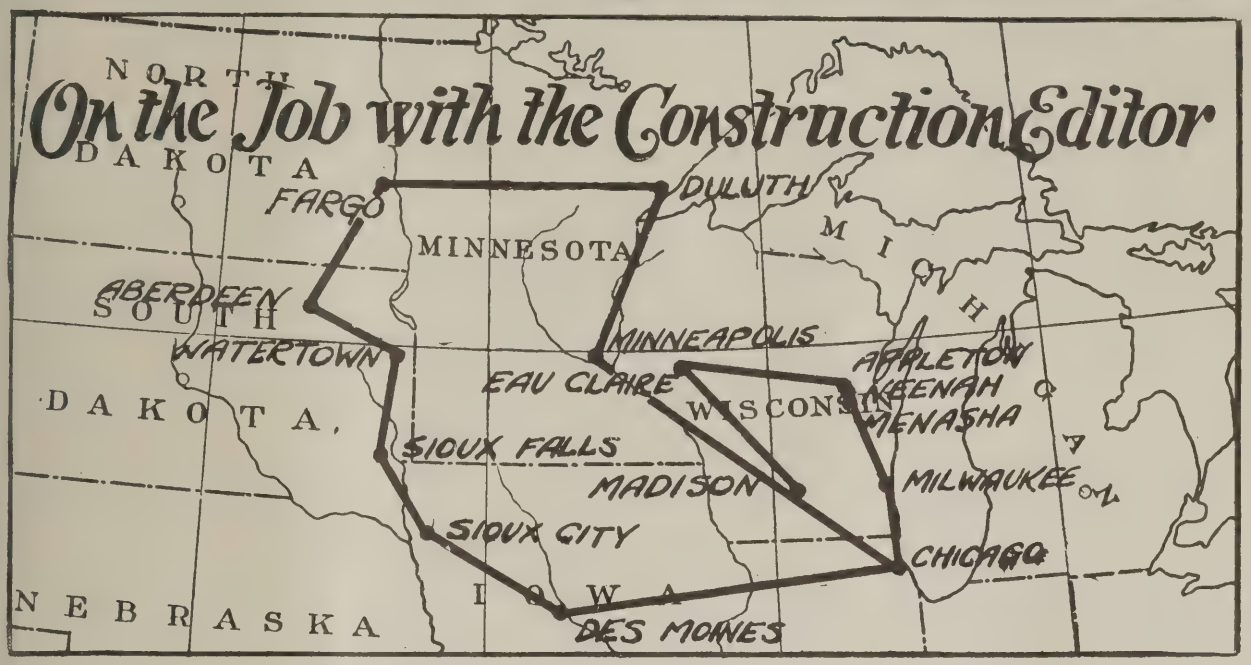
But they didn't, for the base used by the Stone-Tone Stucco Company is magnesite stucco, an oxychloride cement composition that has proved its merits under the most trying conditions. There is no cement in this mixture; therefore, the coefficient of expansion is one-fifth that of ordinary stucco, and it does not crack. It also possesses three times the tensile strength of other stuccos, and has great flexibility and elasticity.

They employ their own men, and the first one they ever hired is still working for them, in the position of foreman. In summer they average 15 men; in winter the number is smaller, because on account of the heavy rains, the finish washes off before it is dried, and the providing of special shelters is necessary. But this is expensive, and reduces the profit, so fewer buildings are put up. It must be mentioned in this connection that freezing weather has no effect upon this finish.

Some 18 different color combinations are possible with stone-tone stucco. These colors may be employed in any proportions best adapted to the building and its surroundings. For instance, the abalone, while very lovely with its iridescent tints, cannot be used too lavishly, but is best utilized in touching up the more somber combinations like black and white. It is good where there are many trees around a dwelling, and a little is effective on the simple lines of a church.

American Legion Hall at Newberg, Oregon, erected by the Stone-Tone Stucco Company

On the Job with the Construction Editor



This map shows the ground Singer has been over on a recent trip

JUST as we started to write this page, Roy M. Singer, Construction Editor of NATIONAL BUILDER, hobbles into the office, with camera and suitcase in hand, returning from a trip up into Michigan five days ahead of schedule. He stepped on a board on a job under construction in Detroit, which turned under his foot and sprained his ankle. The doctor ordered him to stay off his feet for a week, so he comes back to the office to do his "paper work," as we used to say in the army. That will give him an opportunity to catch up with his On-the-Job stuff. It's about the only thing that would make him stay at his desk, for Singer likes the open air, the smell of fresh lumber and wet plaster, and the sound of the carpenter's hammer and saw. This month he tells you about the work of builders in widely separated parts of the country—Massachusetts and North Dakota, Wisconsin and Tennessee. Here are valuable observations for your consideration.

Roy M. Singer, Construction Editor of National Builder, on the job in Neenah, Wisconsin, with Paul E. Schwerin

tions for you—some containing important ideas, others merely notes, simple stunts used by builders here and there that may or may not be worth adopting. Some of these stunts may be "old stuff" to you. Maybe you can improve on them; maybe you don't think some of them practical. Write the Construction Editor your opinion. Send in photographs or drawings and descriptions of your own methods. Make these pages your own. Their value to you will depend entirely on the use you make of the ideas they contain. It costs lots of money to gather this material and more to publish it, but NATIONAL BUILDER spares no expense in serving its readers. The Construction Editor's contributions to the literature of the building industry are unique. NATIONAL BUILDER stands alone among all publications in presenting these observations for your consideration.

On the Job in Tennessee

To Brace Foundation Forms

MANY concrete contractors have been troubled with loose formwork after the whole form has been set in place and braced. As a means of overcoming this difficulty a builder of Knoxville, Tenn., hit upon the idea of butting his bracing against a stake as shown in the photograph and then lining up his forms by driving wedges between

Stakes used to stiffen braces

the end of the brace and the stake. The wedges tend to stiffen the forms by throwing a certain amount of compression on the bracing and thus take up any loose play. This should make the whole arrangement more solid.

Tying Reinforcing

ONE of the meanest jobs on reinforced concrete work is the tying together of the reinforcing with wire. The simplest way of doing this work that it has ever been the fortune of the writer to see was the method used by R. P. Bayley, superintendent of construction for E. G. Holladay Company, of Nashville. Mr. Bayley uses nothing but an ordinary bag tier and bag tie wires as shown in the photograph.

BAG TIE WIRE

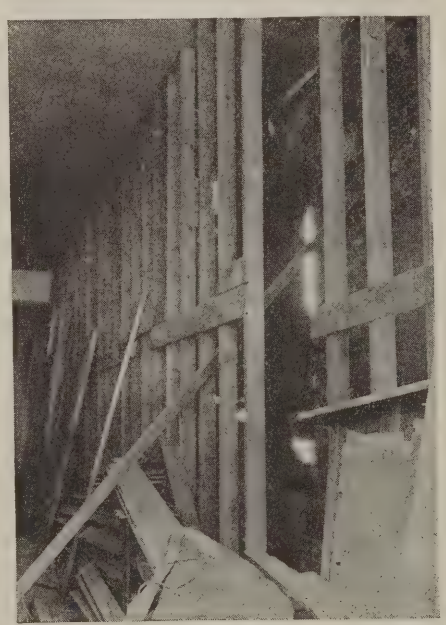
Instead of cutting a length of wire, inserting it in and twisting it with pliers, by using a bag tier one simply slips a tie wire around the reinforcing rods, hooks the bag tier in the loops of the tie wire, gives a tug on the handle and lo, the job is done. No fussing or twisting and cutting of wires.

Bag tier in position with hook through wire loops

This kink is recommended to all contractors doing reinforced concrete work.

Temporary Floor Support

IT is sometimes necessary to support a wall during the remodeling of a building, and the method shown in the photograph below provides a simple and inexpensive way of doing the work. It consists of nothing more or less than ordinary 2x4 studs, spaced the same distance apart as when used in house construction and braced with such odds and ends as may be found on any job. These 2x4 studs rest on a 2x4 sill at the bottom and bear against a 2x4 plate at the top, thus allowing for proper distribution of the load. The efficiency of this method of temporary support is readily shown by the fact that no cracks are shown in the ceiling plaster.



Inside view showing temporary studding

The photograph was taken on the Eighth Avenue remodeling job of Harry C. Howell & Brother, contractors of Nashville, Tenn., who used this studding to support the floor while the sidewall of the building was removed to permit widening of the street.

Formwork for a Stone Pier

THIS method of building a stone pier is used around Chattanooga, Tenn., where rough stone is quite an important decorative feature of many small houses. It consists

Note the way the materials are arranged on the scaffold

of nothing more or less than a strip at th four corners, held together by a few lat which are nailed on for stiffness as th work progresses. The stones are laid be tween the guides and a good looking job i generally the result. Battered piers may b built by nailing a shorter strip at the to of the guide poles than is nailed at the bo tom, this producing the desired taper. Not by the layout of the materials on the scaf fold how the work is carried on. One han is used in laying the mortar, and the othe in placing the stone.

On the Job in Madison, Wis.

n Elevated Mortar Board

NE way of getting better efficiency from labor is to provide as many de-es as possible to make the work lighter l to conserve the workman's energy. y method by which a workman's labor y be made easier or more pleasant is nd to pay the contractor in rich re-ns of increased production.

n this illustration is shown an elevated rtar board used by the Way Building mpany of Madison. Notice that when mason picks up a trowel of mortar he s not have to stoop to the scaffold el but merely needs to turn around. us not only is his energy conserved, ce it is not necessary for him to bend, t also the time occupied in bending is ed. This is, of course, only a fraction

Notice that the mason does not have to bend as he picks up mortar

a minute but if one can realize the mber of times the workman stoops to k up mortar it is not difficult to under-nd that these fractions of minutes unt up in a day to the time required r laying several bricks.

This is one of the many little labor sav-s that make money for the builder. It o may serve to show how the stopping a very small loss may result in a con-lerable saving.

A Kink for the Remodeling Contractor

THE illustration shown here was made on a store-front remodeling job in Madison. Thomas P. Copps was the contractor. Instead of building and bracing a scaffold these supports are used in the

The solidity of this scaffold is assured by its well-built base

manner shown, and the time occupied in building the scaffold and the dismantling of it, is saved.

They are built of 2x4's and the vertical pieces are bored for one-inch holes spaced six inches apart. A seven-eighths-inch bolt can be slipped through these holes to furnish a support at any level for the 4x4 which holds the scaffold plank. An important item in connection with this standard is the base. Note how solidly it is constructed and the manner in which it is braced. This is necessary if a firm scaffold is desired.

A Well-Built Mortar Box

SOME contractors consider their mortar boxes in the light of a hit or miss piece of equipment that is thrown together from odds and ends, used for one job, and then scrapped. Not so, however, the William H. Deason Company of Madison. The mortar box they use is shown here and it has many features to recommend it to the builder who considers his mortar box as a piece of equipment rather than a box built of scrap lumber.

The framework of this mortar box consists of 2x4's. A long piece is used to carry the bottom boards and attached to this long piece is a short stud stiffened by a brace nailed to the bottom piece as shown. The bottom 2x4 is extended far enough past the side of the box to furnish a place upon which the brace can be nailed. The ends of the box are sloped to prevent the mortar from lodging in the corners. Notice that the end of the box upon which the hoe is resting is sloped more than the opposite end. The purpose of this is to make it easier for the mortar-mixer to draw material out of the box with his hoe or to furnish a place where stiff mortar can be worked.

If it is desired to "knock-down" this box it is only necessary to rip off the boards. The bents which furnish the base upon which the box is built can be transported or stored without breaking them up since they occupy little space.

This box can be easily knocked down and set up

On the Job in Belmont, Mass.

Protection for Pipe Ends

WHEN threaded pipe ends project up through a floor some protection is necessary to prevent battering the threads. This illustration shows how Keefe Brothers of Worcester provide this protection. They

The wood blocks must be high enough to come above the end of the pipe

simply nail four pieces of scrap lumber in the form of a hollow square and set it over the projecting pipe. This serves to prevent the ends from being bumped or knocked since the pieces of boards act as fenders.

Finishing the Doorway Last

AUGUST JOHNSON, a builder of Boston, who was erecting several houses in Belmont, in order to prevent defacement of the building doorways simply let the trimming of the door openings go until the last part of the job.

When doorways are finished before the job is done they are quite easily damaged by workmen who are carrying in material and in some cases the entrances receive lasting disfigurements. This builder takes no chances. He cuts off the wall just at the opening, leaving alternate stretchers projecting to provide a good bond for patching the wall at the entrance when the time comes for this work.

The opening will be finished when all roughing-in is completed

Steel Columns Under Porch Posts

THE ordinary method of building up for porch posts is to carry a concrete or a rubble pier up to the grade from the foundation level, and to rest the post on this pier. Here, however, is another way of doing the job.

A hole is dug to the proper depth and a

This column takes the place of a concrete pier

footing put in. A standard building column of a height equal to the distance between the under side of the porch girder and the top of the footing is set on top of the footing and used to support the porch post, as shown in the illustration. Where a concrete pier is more expensive than a building column, the methods shown here may well be used to save money.

This photograph was made in Belmont, on a job of W. J. Clark, a contractor of Watertown.

Temporary Girder Support

IT is sometimes necessary to support a girder temporarily and various schemes are used for the job. The illustration shown here tells how Hugh McDonald, a Roxbury contractor, who was putting up a building in Belmont, does it.

Two studs, cut a bit longer than the dis-

The girder can be leveled by increasing or decreasing the distance between the diagonals

tance between the basement floor and the bottom of the girder are used to support the load. The studs rest on a short plate so that a firm base is assured. They are placed against the under side of the girder and then set on the plate. In order to level the girder, all that is necessary is to drive the foot of the studs forward or backward on the plate. When the proper level has been reached a cleat is nailed across the studs to hold them in position. This method of support serves not only to hold the girder at the proper level, but also to prevent its tipping sideways as the two studs are really diagonal braces and the whole assembly of girder, studs and cleat, acts like one end of a mason's horse. When the support has served its purpose the studs may be used elsewhere.

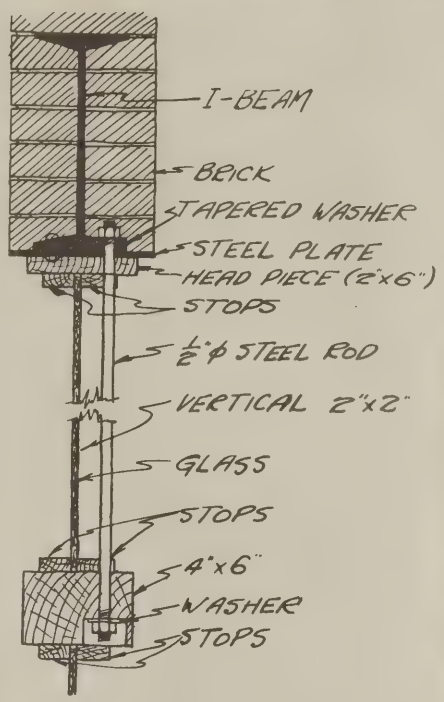
On the Job in the North West

Suspended Window Frame

THE Carlson-Snitkey Company, contractors of Sioux Falls, use an interesting wrinkle in connection with store-front framing. In order to do away with heavy framing at the window corners they suspend the top horizontal member from the I-beam which spans the width of the store in front and supports the brick-work over the show windows. A ½-inch round rod threaded at both ends is run through the plate which is riveted to the beam. One end is run through the lower wood frame which is mortised to receive a nut and washer. After the rods are in place the frame is leveled by screwing up the nuts. The head-piece which rests next to the steel beam is held in place by vertical struts which are placed between the lower and upper member before taking up on the rod, and thus are held tight when tension is taken in the rod.

It is important that these vertical 2x2 pieces be set between the two horizontal members of the wood frame. If they are left out, there is great danger of cracking the plate glass when tension is taken in the rods.

View of store-front



Sketch showing details of construction

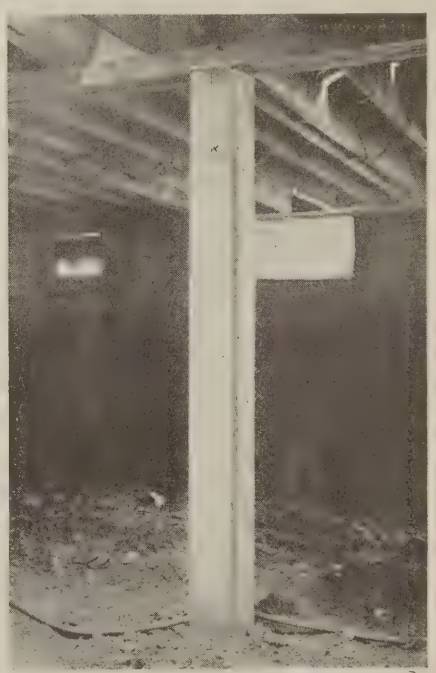
Extra Header for Heavy Pipes

THE problem of locating heavy soil pipe in a second floor bathroom was solved in the manner shown below by framing the obstructing joists to an extra header, thus making deep cuts in load bearing joists unnecessary. This cost a bit more than simply cutting the joist but it made a much better job.

This photograph was taken on a job being done by the Montplaiser Building Company of Fargo.

Precast Concrete Basement Columns

MANY things are used for basement columns, but Harry Velton, a builder of Sioux Falls, claims some particular advantages for the precast concrete columns he uses. They can be made when a workman has spare time and can be delivered on the job when needed. These columns are 8 inches square and to prevent chipping the corners are champered. A 1-3-6 mixture, using no stone larger than will pass through a ⅜-inch screen is recommended to secure a good column.



There is no danger of these concrete posts rotting from dampness

This header saved cutting the joists. It did cost more but the added structural strength of the building over what it would have been if the joists were cut was well worth the price

On the Job in Wisconsin

To Prevent Splitting at Ends of Runway Planks

MANY builders have sought for some way to prevent the destruction of runway planks due to splitting at the ends but have been unable to find a preventative. The picture shown here is probably the best remedy for the trouble. It may not prevent splitting entirely, but it will hold the planks together after splitting has occurred and will serve to prevent the

The sheet metal strips go all around the plank

elongation of the crack and the consequent destruction of the plank.

This "kink" is nothing more or less than a two-inch, heavy-gauge sheet metal band nailed at the ends of the plank. It should be bound tightly around the plank so that it acts in a manner similar to the barrel hoop.

The cost of placing these strips is very small.

Credit for the idea belongs to the Pfeifer Construction Company of West Allis.

Concrete Course Over Random Stone Foundation

TO reduce the cost of a building, contractors generally use materials most readily available if these materials are suitable to the purpose required. John Miller, a builder of Appleton, is a firm believer in the above statement and so,

The concrete band is between the stone foundation and the wall above

instead of building a concrete foundation for which crushed stone would be necessary, he uses random stone which is found in the vicinity of Appleton. The difficulty in building a random stone foundation is in finishing off the top to a smooth surface so that the upper portion of the wall can be laid without undue trouble. Much chipping and fitting of small pieces is required and this is expensive.

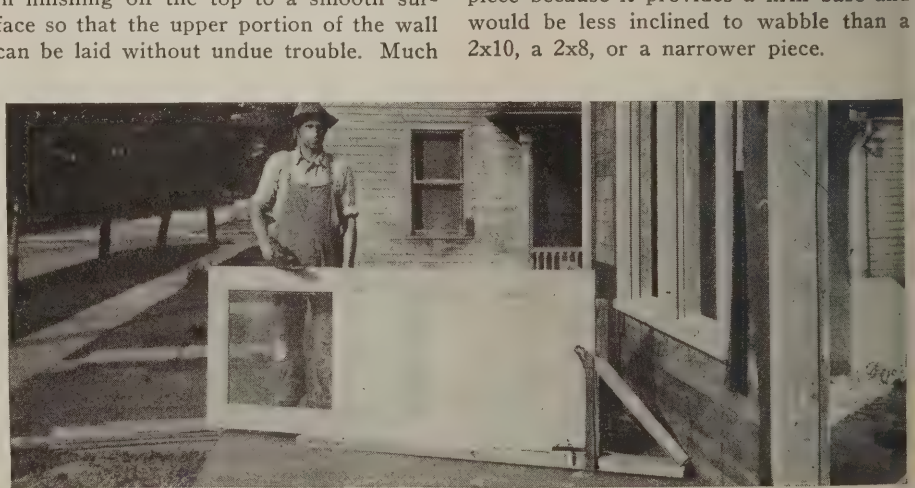
Mr. Miller, however, simply lays his foundation to a short distance below the grade level, builds a shallow form on the foundation and pours a one-foot-deep concrete belt all around. The concrete fills all the hollows and provides a smooth top surface for laying the upper wall (which in this case was concrete blocks), thus doing away with the expensive chipping and fitting. This concrete belt course also gives the foundation a better appearance on the outside than if the stone were allowed to show above the grade.

A Well Built Door Jack

TO do a good job of planing a door to fit a jamb, some means of holding the door fast is necessary while the edge is being planed. Most carpenters use a piece of 2x6 with a V cut in the end and support the door with one hand while they operate the plane with the other.

Paul E. Schwerin, a builder of Neenah, has his own idea of how to do this kind of work. He uses the outfit shown in the illustration here. It is made of a long piece of 2x12, a short piece of 2x6, two short lengths of 1x4, and a couple of cleats. The 2x6 is nailed to the 2x12 at an angle, as shown, and is supported by a 1x4 strut on each side. It is notched at the top end in the shape of a V to receive the door. The door is held fast at the lower edge by the cleats which are nailed to the 2x12 and spaced just far enough apart to permit the door to slide between them.

The 2x12 is used instead of a narrower piece because it provides a firm base and would be less inclined to wabble than a 2x10, a 2x8, or a narrower piece.



This device holds the door firmly and allows the carpenter to have both hands free

On the Job in Binghamton, N.Y.

Framework for Hanging a Sheet-Metal Cornice

IN construction where heavy cornices are used some contractors prefer to use metal instead of stone because of the difference in weight and cost. Sheet-metal cornices, when properly protected by paint, will last a long time but if they are not erected in the proper manner they soon loosen from their base and open up, and it is not long before disintegration in the form of rust sets in.

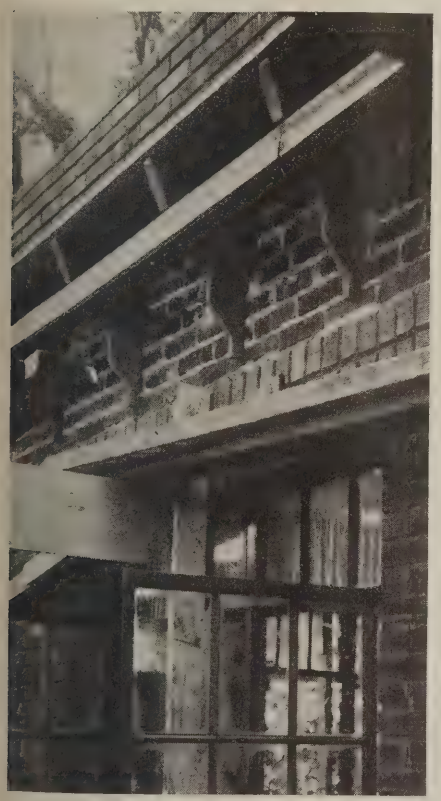


Fig. 1—This view shows the wood backing for the cornice

The two photographs illustrated here show a method for fastening a sheet-metal cornice to a masonry wall. The work was done by Lynch and Son, sheet-metal contractors of Binghamton. The accompanying sketch is a section through the wall between lookouts. Fig. 1 shows the wall before the cornice was fastened and Fig. 2 shows the cornice in place.

Lookouts, built of 2x8, support and carry the weight of the cornice. The top of the lookouts are covered with sheathing, which will be later covered with metal flashing which will fit into the lock on the upper edge of the cornice crown molding. Reference to Fig. 1 or Fig. 3 will show how the projecting ends of the lookouts are cut to receive the cornice. A ledger board is run

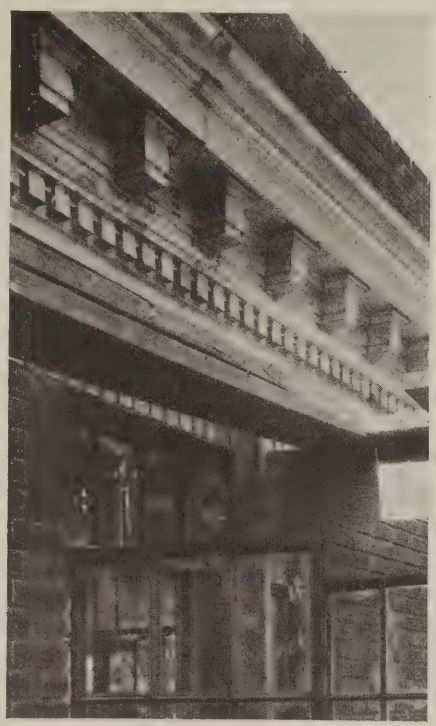


Fig. 2—This view shows the cornice set in place

across the lower ends of the lookouts to provide a backing for the corona, and cleats are nailed to the lookouts to permit fastening the modillions and dentils. A drip is worked into the foot mold of the cornice and the metal beyond the drip sets into the masonry joint. Notice in Fig. 3 how the flashing is set into the wall.

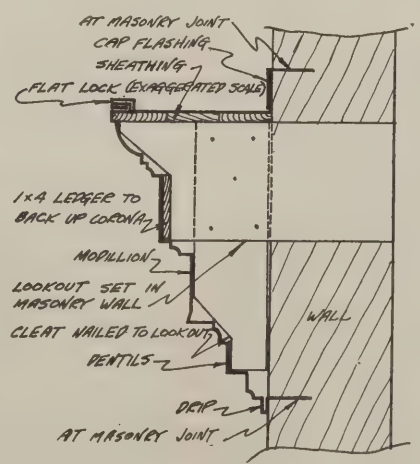


Fig. 3—Detailed sketch

Temporarily Hung Door

NO contractor feels assured that his job is safe when there is a possibility of hoodlums or vandals gaining access to the premises. For this reason most builders have some way of closing a building to keep the intruders out.

In the illustration shown here is a photograph taken on a remodeling job being done by T. I. Lacey, of Binghamton. The doorway is at an apartment entrance which opens off a hallway. This apartment was

The vertical stud acts as a temporary jamb

used to store hardware and tools and some means were necessary to prevent theft and damage. The building was far from completed at the time this picture was made and it was considered inadvisable to place a good door at this opening for fear that it would be damaged by laborers carrying materials in or out.

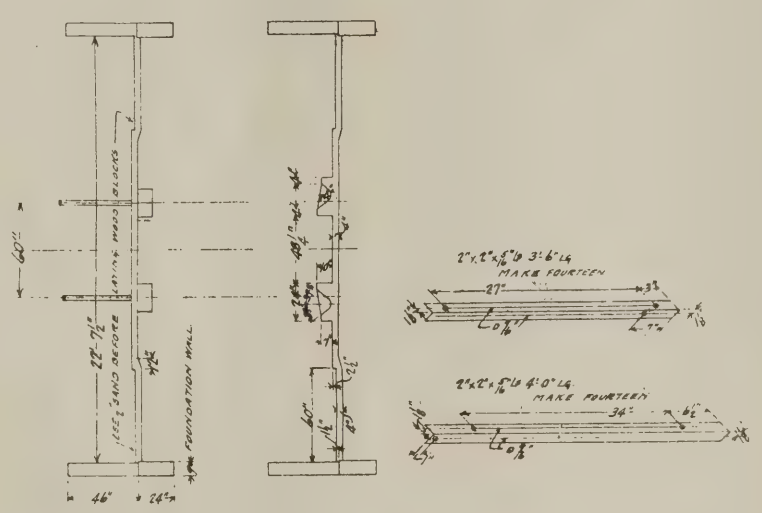
An old door was available but as this was a bit too narrow to hang in the opening a stud was set as shown in the illustration and used as a base upon which the hinges could be screwed. The stud was toe-nailed both to the frame head and to the floor.

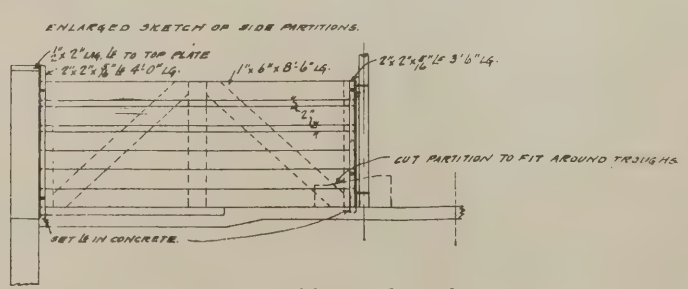
A Community Hog House

IN localities where small farms abound and small stock herds are the rule, community houses for sheltering farm animals may be used to advantage. Instead of each farmer providing a small and more or less practical building for housing his stock the community plan means the erection of a large modern structure with all up-to-date conveniences and improvements. Thus, instead of a number of small barns scattered about the community, the stock is all concentrated into one large building where it may receive proper care and attention.

The community hog house shown here may be erected at moderate cost. The floor and lower walls are built of concrete and the upper walls are of wood on a stud frame. The roof is of the usual frame construction with additional 1x6 bracing to stiffen the rafters. The chief advantages of a concrete floor is that it is more readily kept clean than any other kind but it has a disadvantage in that it is cold in the winter time and thus not conducive to the comfort of the stock. To overcome this drawback wood blocks are laid in the pens. These blocks provide a place where the stock may lie comfortably. In order that the wood blocks may rest on a solid base, a layer of sand, one-half inch thick is spread over the area where the blocks are laid. This sand acts as a cushion and serves to take up all the inequalities of the concrete base, thus making for a firm and well laid floor.

Community hog house on the farm of F. A. Huber, near Marion, Ohio



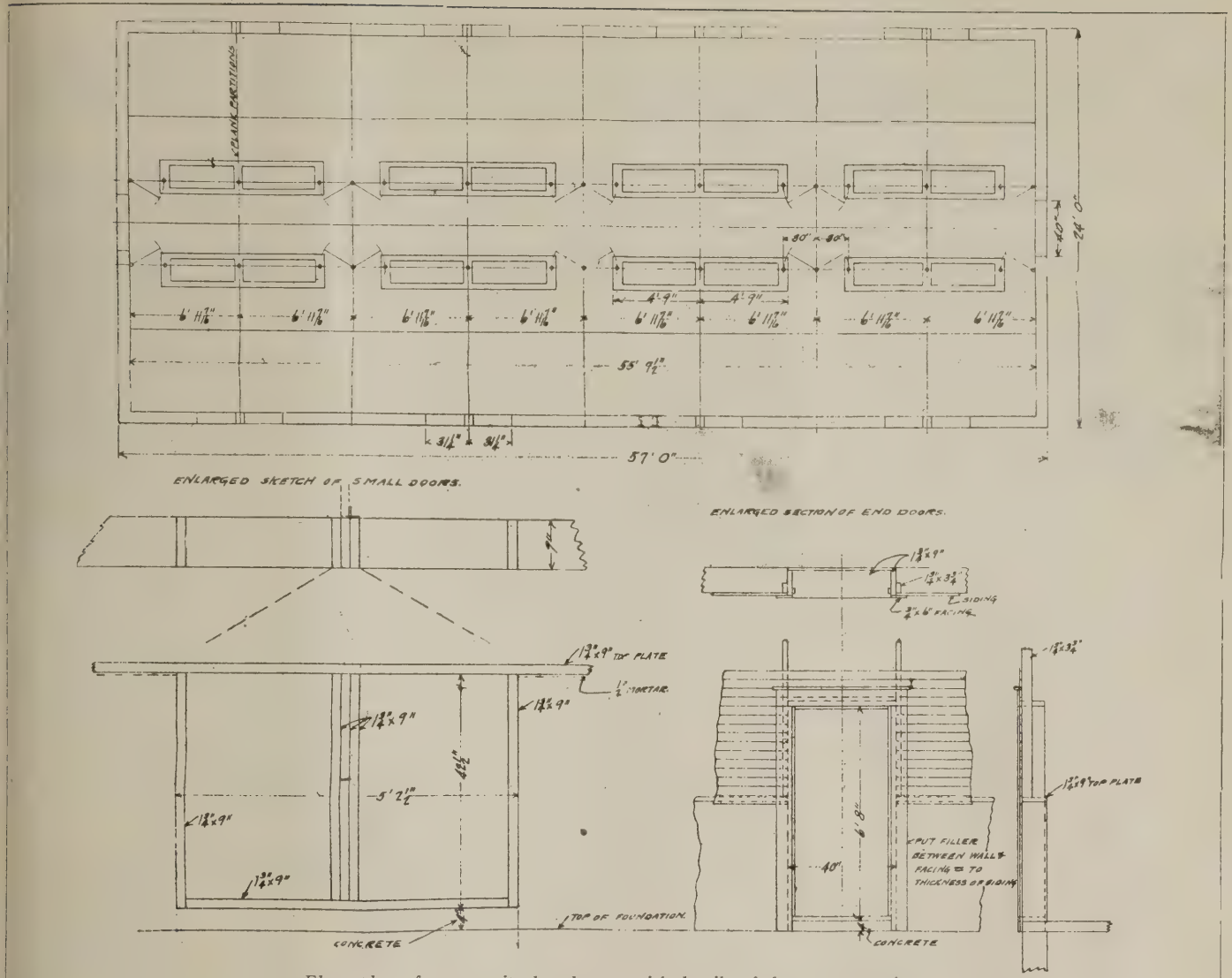


Sketch of partitions and panels

Sunlight and ventilation, two prime requisites for any farm building where stock is kept, are provided here in good measure by a solid line of sash running around the building at the top of the concrete wall. Additional windows are provided to light the storage space above the stock floor.

The upper floor is carried on 2x6 joists which rest on a girder built up of two 2x6's. This girder is supported from below by iron building columns as shown in the illustrations of the interior. These columns also serve as a support for the metal partitions on each side of the center runway. Notice in the illustration of the interior that a short diagonal strut, nailed to a floor joist, is butted at each column to the girder which carries the upper floor. This serves as a brace and tends to prevent the overturning of the girder and the tipping of the column. This is a construction detail somewhat similar to what is called "wind-bracing" in tall steel-frame buildings.

The partitions which serve to separate



Floor plan of community hog house, with details of door construction

the stalls are made of wood and are held in place by being bolted to light steel angles as shown in the sketch. These steel angles are set in the concrete at the wall end of the partition and are bolted to the columns at the aisle end.

This hog-house is located near Marion, Ohio, and was built for F. A. Huber of that city.

Interior of brood sows' quarters. A solid line of sash running around the building above the concrete wall provides sunlight and ventilation

Interior of fattening rooms. Note the diagonal struts nailed to the floor joists and butted against the girder at the iron columns

The Building Outlook as Seen

WILLIAM H. FOSTER, President, THE GENERAL FIREPROOFING COMPANY, Youngstown, Ohio—We hear a great deal these days about the high cost of building, but we fail to take into consideration the subtle changes that are taking place in this country which more or less eliminate the cost of building as an important factor.

William H. Foster

In the first place, in the past ten years the increase in wages has been greater than the increase in the cost of building and, therefore, since the matter of relativity is so important, the increase in the cost of building is not a great factor so long as the income of the average worker is in proportion.

Then again it is to be observed that we are gradually making for a higher standard. The merchant who in olden times did business in a plain, unattractive store of mill construction, in order to keep pace with the new order of things, is now demanding a modern fireproof store of architectural beauty.

The workman who formerly lived in a tenement is now ambitious to own a cottage with bathroom, electric lights and all the other refinements that go with it.

These features make for stability and progress in building construction which, in my opinion, will continue for many years, the principal limiting feature being the scarcity of artisans in the building craft lines to do the work. The remedy lies in a more liberal apprentice system.

J. C. CARROLL, Jr., Secretary, BUILDERS' EXCHANGE, Little Rock, Arkansas.—The building outlook in this section of Arkansas is exceedingly bright. At this date we are leading last year's building permits by quite a nice figure, and there seems to be no letup in commercial as well as residence construction.

Labor conditions are extremely favorable, having no labor troubles of any description for the past forty-three months.

Our contractors have made it a rule on the signing of contract, to immediately place orders for all material required, and in this way have not been handicapped on the account of slow shipments and factory delays.

The War Department has issued plans and specifications for six fireproof buildings to be erected at Fort Logan H. Roots, North Little Rock, for the United States Veteran Hospital No. 78, and bids on these buildings will be opened October 16.

We are enjoying a steady increase in construction work, and there seems to be no letup for the remainder of the year.

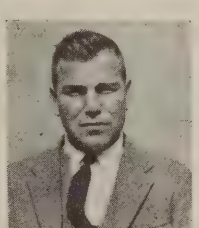
ERNEST T. TRIGG, Chairman, SAVE THE SURFACE CAMPAIGN, Philadelphia—Business in the paint and varnish industry is good. Plants are running full time, with some still operating overtime. Sales for the first six months of 1923 showed an average tonnage increase throughout the country of 32 per cent over the same period in 1922.

Ernest T. Trigg

However, during recent months, goods have not been moved from the dealers' stock to the extent that dealers have been willing to prepare for consumer demand. June and July show an increase over last year, for the same months, but are not maintaining the 32 per cent average increase. These conditions are only temporary, however, because the industry, through the Save the Surface Campaign, is planning an intensive campaign during the fall months, for the purpose of eliminating dull periods by extending the painting season.

The slackening up of construction has, of course, affected the paint industry to some extent, although only one-quarter of the architectural paints and varnishes go into new construction, while three-quarters go into repainting.

W. O. KIRKPATRICK, Building Inspector, CITY OF FLINT, MICHIGAN—The following is a brief summary of building conditions existing in the city of Flint:



W. O. Kirkpatrick

We are experiencing at the present time a remarkable increase in public and industrial buildings. In the past five months we have issued in our office 2172 permits, or a total of $5,113,382. Of this amount 45 per cent is for the construction of new homes.

In the present month of September we will have under construction approximately 400 additional homes and a big program on industrial and school construction. We are also doing quite a bit of public building and improvements in the manner of erection of additional fire stations, bridges, etc.

We are experiencing an acute shortage of bricklayers, plasterers and tile setters. At the present time the supply of common labor is hardly equal to the demand and I believe that conditions will be even worse after the winter months set in when men will be seeking inside employment.

The outlook for construction for the next season is exceedingly good. I believe that building operations in Flint will increase in 1924 at least 200 per cent. This increase I believe will be approximately 50 per cent residential and 50 per cent industrial expansion.

P. A. HUGHES, Sec'y, PLATE GLASS MANUFACTURERS OF AMERICA, Pittsburgh, Pennsylvania.—It is my opinion that building activities will continue at a brisk pace for the balance of 1923. From information that reached our office, we find that, as the season advances and the prevailing prices of staple commodities remain practically unchanged, builders are inclined to believe that costs are beginning to stabilize, and for this reason are showing a greater disposition to place contracts for their requirements.

P. A. Hughes

Building operations throughout the country continue to exceed last year. From New York we received the report that in the metroplitan district the shortage of labor has been somewhat overcome by the completion of many speculative jobs, thereby releasing workmen for employment upon new construction.

The building permits in Chicago for August took an upward trend, exceeding July by something over three and one-half million, and exceeding August, 1922, by slightly over two million. The labor situation is in a more satisfactory condition than it was in the early part of the year, and no trouble of any importance has been reported in the building trades generally.

The manufacturers of polished plate glass still find a keen demand for their product, and from all the information that I have been able to gain, a market is waiting for all the plate glass that can be manufactured during the balance of 1923. This condition exists in the face of an extremely large increase in the production of polished plate glass during the past two or three years. In 1921 the total production of polished

by Leaders in the Industry

plate glass in the United States was 53,578,682 square feet. In 1922 production increased to 76,678,207 square feet. The production for the first six months of 1923 was over 43,000,000 square feet, and it is a conservative estimate that the total production for the year 1923 will be over 90,000,000 square feet, or an increase of about 70 per cent over the production of 1921.

The present large demand for polished plate glass is due to an increased appreciation of the value of the product for buildings other than large structures for commercial purposes, in which plate glass has always been in favor. A large quantity of plate glass is also used in the interior of buildings for covering flat surfaces, to protect the highly polished finish of broad window sills, table tops, and the like. The increased production of the closed automobile has also been a large factor in creating a demand for polished plate glass, as an average of 25 square feet of polished plate glass is used for the windshield, windows, and doors in each closed car produced by the automobile manufacturers. With very slight exceptions, nothing else but plate glass is used for this purpose.

JAMES K. DAVIS, Manager, JAMES K. DAVIS REALTY COMPANY, Dayton, Ohio—Unprecedented inquiry and buying of lots and suburban ground would indicate a lively fall building program in Dayton and the Miami Valley.

James K. Davis

The upward price trend recently, of many commodities in non-building lines, seems to be proof to many home-seekers that a drop in building and real estate is very unlikely.

With the price of farm products still unprofitable to farmers, many of the young men raised on farms are continuing to journey cityward, thus maintaining an ever-increasing need of housing in the cities.

Money, which is always a necessary factor in a large building program, is still being deposited in the many building associations in the community. In fact, the savings deposited this year have been proportionately larger than any other single year. This proves that the working man is saving a substantial part of his earnings. This is one of the most hopeful signs for a lively fall building program, as money in large amounts is necessary to carry on extensive building operations.

FRANCIS J. PLYM, President, THE KAWNEER COMPANY, Niles, Michigan—Many economists, experts and others are continually predicting one thing or another relating to the progress and development of the business interests of the country, so much so that one is apt to get confused with these various predictions.

Francis J. Plym

Judging from the reports through our own organization, we find at the present time the most healthy and active business conditions. This is true not only in Michigan, but extending from New York to San Francisco.

Some lines of commercial activity, no doubt, have slowed down. The metal market has particularly been depressed as well as other commodities, but in the line of store fronts we have found practically no recession and we feel that we will continue so. We also believe that prices will be firm for many years to come and do not look for a return to normal prices until there has been an entire readjustment of all industries and activities throughout the world, which will require years to consummate.

Building construction is still behind when we consider the inactivity during the war period and every indication seems to be that next year will be equally as good a year as this. As soon as people know these conditions and believe them we will have a better and more healthy condition than when they are waiting and hoping for lower prices.

ROBERT W. SAVAGE, PRATHER & ROBINSON, Real Estate, Washington, D. C.—The District of Columbia may properly be placed among the list of cities exclusively residential. Investigation shows a lack of industrial projects and practically absolute dependence upon the federal government, there being over 65,000 men and women, or 14.5 per cent of the city's total population, on the federal payroll, August 1, 1923. The earning capacity of these employes averages approximately $1400 per year. Possibly a similar number of employes of retail business houses have the same average yearly income.

Local builders during the past few years have had a tendency to build only the highest type apartment buildings and residences costing upwards from $10,000. Inflated prices of material and an acute shortage of both skilled and unskilled labor have been influential factors of this condition.

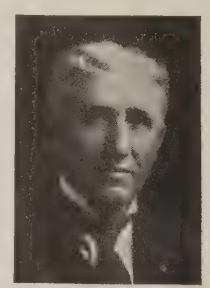
A decided slump the past few months in the sale and rental of such properties is producing a change of conditions.

I believe the next thirty days should see the inauguration of several large projects for the construction of small, low-priced buildings for the $1400-per-year employe. There are hundreds of prospects waiting, ready to buy or build such homes if the prices can be brought within their reach.

Gratifying activity, not only for the next thirty days but for the remainder of the year, is my prediction.

The demand for business and investment property continues good.

ARTHUR G. LINDLEY, Architect, Los Angeles—I consider that the present building outlook is unusually good. The work in the architectural profession at the present time is all that could be hoped for it, judging from the conditions in our own section of the country and it is much above standard. It is my opinion that during the next thirty days it will be better yet, as owners are seeking the architects to get their work handled, and it is difficult for the architects to complete the plans as soon as the owner desires to have them done. We can see no probability of a slow-down in the building industry in this section in the near future.



Arthur G. Lindley

J. H. GROGG, Secretary-Treasurer, NORTH CAROLINA REALTY COMPANY, Asheville, North Carolina—Building is very active in Western North Carolina, particularly in Asheville.

The activity in this section is largely due to the fact that people are locating here, throughout the year, from all parts of the United States and many foreign countries, on account of the healthful climate, fine scenery and roads.

The construction of many high-priced school buildings, hotels, store buildings and the unlimited number of dwellings, from the cottage to the mansion, keeps an active movement here in all building lines.

The price of all kinds of material and labor have been unusually high, and prompt shipments hard to secure, with a scarcity of certain classes of material and mechanics.

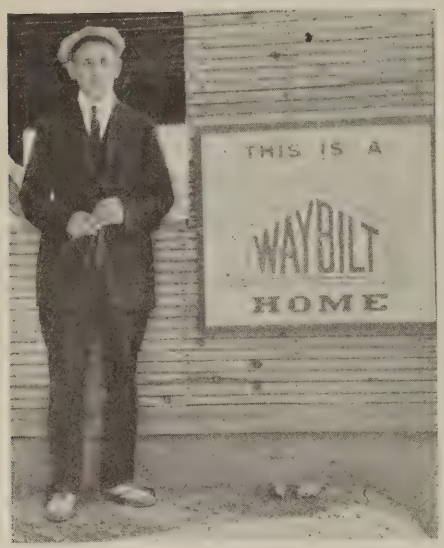
The outlook is exceedingly bright for the future, with no indication of a let-up.

With all the building, there is a continual unsupplied demand, particularly for boarding houses, rooming houses and hotels.

"We Build Good Houses and Tell the World"

Charles T. Way, Successful Builder, of Madison, Wisconsin, Does Not Hide His Light Under a Bushel, but Lets People Know He Is the Builder by Means of Unique Signs on All His Buildings Under Construction

By Roy M. Singer
Constructoin Editor



Charles T. Way, builder, of Madison, Wisconsin, and a sign such as he puts on all his jobs

DURING a recent visit to Madison, Wisconsin, I happened to see an attractive sign on a house which was under construction. It said "This is a Waybuilt Home," and it was painted neatly in black and white, and cleverly designed.

Here, I thought to myself, is a man with a good idea. He not only places a sign on his job to let people know who is doing the work but also he has taken care to make the sign neat and a little out of the ordinary so that its unusual design, as well as the fact that it was evidently a trade-mark, would be bound to attract attention.

I had not driven very far before another "Waybuilt" sign appeared. Then another—and another. I felt then that I couldn't leave Madison without visiting the originator of the "Waybuilt" idea so I stopped at one of the houses which bore the familiar trade-mark and asked the foreman for the office address.

At my request a look of surprise spread over his face. "Don't you know where our office is?" he asked. "I thought everybody in Madison knew. It's 20 North Orchard Street."

Then I explained to him who I was and asked him how it came about that everybody in Madison knew where the "Waybilt" offices were. "Why," he answered, "they can't help knowing; we tell 'em. See that sign?" he said, pointing to a "Waybilt" trade-mark nailed to the front of the building, "that tells 'em who we are and they see so many of those signs all over town that they just naturally get curious and find out who is building all these fine houses." That was the foreman's viewpoint.

Some "Waybilt" homes under way in Madison, Wisconsin

So I went over to the office and saw Mr. Charles T. Way, who is the general superintendent of construction for the Way Building Company, the builders of "Waybilt" homes. We had an interesting talk and then he took me out to the mill where most of the millwork for "Waybilt" houses is made. He introduced me to his brother, Wilfred Way, who takes care of the mill end of the business.

They showed me through one of the best-equipped and most efficiently planned small woodworking plants I have ever seen. The shop contained drum and belt sanders, mortisers, band and circular saws, a sticker, a planer, a combination mill outfit which was the nucleus upon which the shop was built, and several other pieces of woodworking machinery.

I asked them how they accounted for their success. "Well," said Charles T., "it's like this. We build good houses and we tell the world about it. We never do a job without placing our sign in a prominent place somewhere on the work. All our trucks carry the 'Waybilt' trade-mark and as they run all over town we figure they do considerable to bring our name before the home-buying public. We maintain our own architectural department and specialize in home building, and with the exception of plumbing, heating, and electric wiring, all work is done by our own men. I should say, however, that no small part of our success is due to the fact that we put our signs on every job and never lose an opportunity to bring the 'Waybilt' trade-mark before the public."

Here, then, is food for thought. How about you, Mr. Contractor? Do you "tell the world?"

The office of the Way Building Company is a neat little bungalow-like building. Note the shop in the background

Interior of the Way Building Company's shop. The woodworking machinery is on the first floor and cabinet makers on second

Suggestions for the Beginner in Architectural Drawing

By V. L. SHERMAN

IF the writer is not mistaken it was Dr. Holmes who said that "the world can have a million roosts for a man, but only one nest." Such sentiment cannot be ground into the architect and builder too thoroughly. The itch for tile floor and wall, period decoration, and all other symptoms develops in many cases, where pure judgment is wanting, into nothing but impersonal decoration of supposed homes. The primary element of the home is comfort, and lack of irritating features has much to do with comfort. The stair is more or less likely to cause irritation if it is not properly laid out, and then properly built. Stairs should not take too much floor space, especially in a small house, and they should not be too steep. There are various rules for finding the rise and run in stairs for this or that sort of building, but these rules put a constraint on the draftsman that may prove a hindrance. Remember that for dwellings 7¾ inches is the limit for a riser,

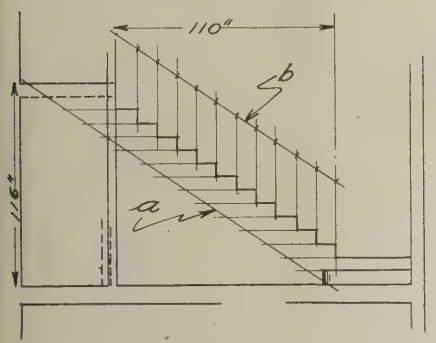


Fig. 1—Stair layout

and that no tread should run under 10 inches. Then there is the feature that is most abominable of all—lack of uniformity in rise or run. The draftsman should pay attention to this in the case of winders. Here an apparent uniformity will cause the stranger to stumble. Tread should be taken in this case at most 24 inches from the inside. It is admitted, of course, that there are many stairs in use these many years that have never caused an accident, and that many steep stairs have been used. But if you want to build comfortable stairs do not attempt to stretch your judgment.

In laying out the stair, referring to Fig. 1, it is very easy to use the geometrical proposition of similar triangles. There were to be 15 risers in all of the height, 116 inches, and two of these were to reach the first landing, and the last was to come from the second landing. This left a run of 110 inches for 12 risers or 11 treads The line *a* was drawn in anywhere between floors to a length of 15 feet, and every foot marked. Then the line *b* was drawn in anywhere between the 110 inch marks to a length of 11 feet. The marks at every foot on the second line were projected down, and the marks at every foot on the line *a* were projected horizontally. The intersections show the stair outline. It should be repeated: "Don't attempt to lay off risers singly to a fraction of an inch for there is always a slight error which accumulates as the number of risers increases."

While figuring stairs never neglect to figure headroom *at the same time*. Headroom is a hard thing to imagine, and many are the mistakes that are made in figuring. Better satisfy yourself by marching a dummy man downstairs (not upstairs, for you are bent forward then) than to make a miscalculation in this regard. It is impossible to sidestep. And don't contribute to the unhappy tendency to duck when going downstairs.

Fig. 2 shows the entrance corner of the house under discussion in the last number. This photograph is used to show the necessity for careful estimate of sill heights in windows. The best ideas you can get on this subject will come from carrying a tape in your pocket, and trying out a few that strike you for their good or bad qualities. This is not to say what proper sill heights are, for they vary, but some definite ideas should be gained before the plans are very far under way, and your ideas should not be too much hindered by the appearance of the sill from the outside. Irregularity in sill heights from the outside has been shown an attraction by some of the real architects. In the figure you will note that the sills were brought just low enough to escape a view of the back of the old sofa from the outside. While on the subject, and to emphasize again the point of comfort, do not make too many rules for yourself in drafting. Rather forget the rules and develop your judgment. Increase your powers of perception and imagination. Study buildings that have some reputation, either good or bad. Take photographs of whatever seems notable, or, better still, make sketches. I remember one rule for height that was delivered by a master plumber; 36 inches must be the height of the sink, until the prospective housewife saw it. It seemed she never stood up at the sink, but made use of a very handy stool. Thirty-six inches was much too high.

This brings up the point as to who should have the most say in the design of a house. If you want to know who does have the most say ask any architect. If he fails to satisfy the housekeeper his business in dwellings is never very strong. No draftsman can afford to slight the ideas of the women-folk in laying out floor plans. It is the encouragement offered by women to architects and housefitters that has changed a great many things which man thought was settled long ago. He can cut the expense of "a lot of hips, valleys, dormers and false

Fig. 2—Entrance corner of living room

gables" as Mr. McCaslin says, and add a number of very attractive features that will give the house a "pull." In this way, too, he may learn to bring attractive lines to a house that is simple in outline, and thus increase his value as a real designer.

Before going into detailed construction the writer wishes to propose three examples. These houses were more or less adapted from a volume published two years ago by the Southern Pine Association. The plans for this portfolio of homes were furnished by The Architects' Small House Service Bureau. The writer has picked three. The first one, to the left, is a small three-room dwelling suited for the mild climate of the Southern states. You will notice that with practically a square outline a well proportioned house has been arranged, giving plenty of accommodation and floor space while making it very handy for the housekeeper. You will note that in each of the three houses the kitchen is directly connected with the living room. Most wives would prefer to eliminate the dining room and increase the living room and closet space. They are quite right in thinking that the average dining room is not large enough for more than the family, and the living room is the convenient location for scattered tables used at "functions."

The second house, the English cottage of two floors and basement is for a Northern state. The roof is simple and lends size. The break in the front wall allows room for a vestibule and breakfast nook without jarring the outlines of the living room or kitchen. Besides it adds a pleasing touch to the house. This plan shows the privacy of the typical English cottage. The ordinary style of throwing one room into another to increase the apparent size of the house seems to me a distinctly modern device, and one that is not always best. There is much to say for the complete separation of rooms. And while they are completely separated you will find in this floor plan about the simplest layout for convenience.

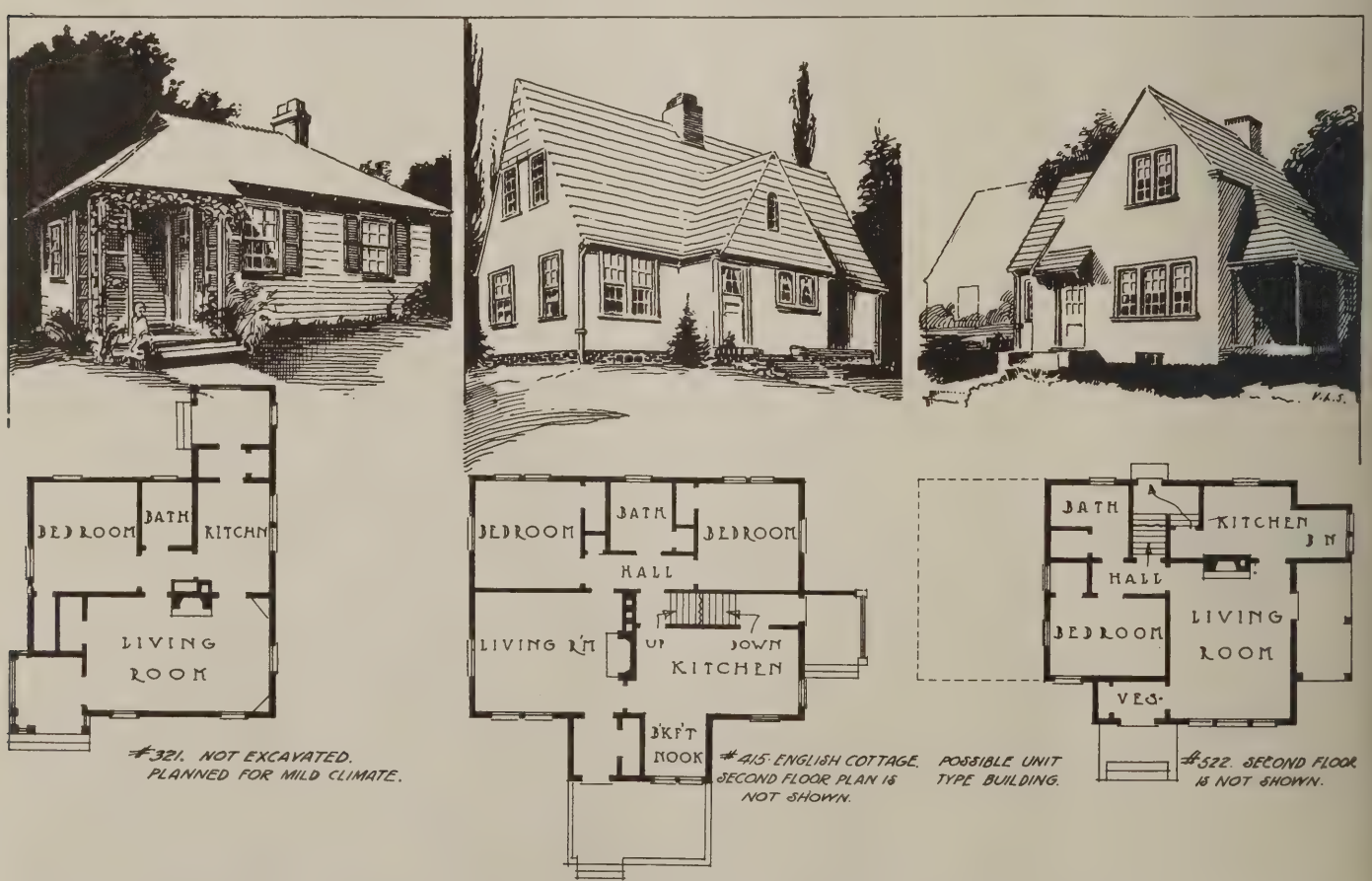
The third house has been altered to make a unit house. It has been the writer's fortune to know many attractive old houses which were accumulations. The original houses were small, and were added to from time to time, as the emergencies arose, until at last they were quite large, and still all were very attractive. Their effect was certainly not one of stilted type, nor of any splendid original design, but there was that about them that caught the eye and made their study profitable.

If more of the buyers could escape the notion that a unit house hinted at economy, and could get along without the "front," this type of house would become very popular. In this case, with a bit added to the length, two more bedrooms can be put into commission.

As another possible example, the house shown in the last article can be taken as a unit house. In the original drawings provision was made for a stone floored library to the west of the living room, opening from the side door, through a small vestibule. Above was another bedroom, with a door to replace the window at the landing. The added portion was not to be excavated, but a large chimney was to give a fireplace to the library and the bedroom.

Before getting into details it is excellent practice for the beginner to take undimensioned layouts or suggested layouts, if they are simple enough and develop his sense of proportion. It is all the better if he will take plans and elevations at the same time, as previously illustrated, and learn to think in terms of the house as a whole. He must teach himself how to execute the plans without executing the house.

The beginner should have something definite to work toward. With all the great number of photographs and plans shown in publication it is easy to select attractive and simple houses from which to work. Photographs are safest, of course, but where an illustration is known to be made without exaggeration it may be used. Stick for a while to simple plans.



These examples taken from the Southern Pine Association's publication of houses by the Architects' Small House Service Bureau, 1921. Redrawn with a few changes by the writer

Paint as an Aid to Renting and Selling

The Necessity for Zinc in Paint

By Albert Brace

THERE are just two ways of approaching the question of painting a wooden exterior. If the purpose is merely to cover up the siding, to give some color to bare lumber —in short, to make the house look "painted," the problem is quickly and easily solved. There is a wide choice of cheap ready-mixed paints, frankly made to meet a price and there is the good old dependable mixture of lead and oil. The labor cost, of course, is the same as for any grade of paint material, but as a means of cutting down the first cost there is little room for improvement.

If, on the other hand, the object is to provide paint protection which will not only hide and beautify but give enduring wear as well, the problem is worth more thought. Cheap, ready-mixed paints must be ruled out at the start, due to the fact that they are composed largely of so-called inert pigments; that is, pigments that do not readily absorb the oil and therefore soon cause cracking, peeling and general decay of the film. Moreover, they rarely contain any real quantity of linseed oil, so that regardless of the names they are substitutes rather than true paint.

When it comes to white lead and oil, however, the proposition is radically different, for white lead as a paint pigment goes back to the Roman Empire and even today no outside paint such as we are discussing is worthy of the name without it. One of the most opaque of white pigments, it has a natural affinity for oil, requires less of it to give it brushing consistency than any other, has no disturbing chemical action, takes colors readily and works easily when applied.

Yet used alone white lead as a pigment is not a perfect medium of paint protection. Inherently soft, it has a tendency, especially under extreme exposure to the sun, to cause the paint film to lose its gloss, "powder," and rub off. Thus a paint coating of straight lead and oil (with proper proportions of turpentine and drier), however skillfully applied, will often show these defects in as little as a year and a half or even less. It is then time to repaint and, though the powdered surface is left in good condition for the purpose, the necessity is no less and the chief expense in all painting is labor. In other days this item may not have bulked large, but today, well, it is hardly necessary to go into figures.

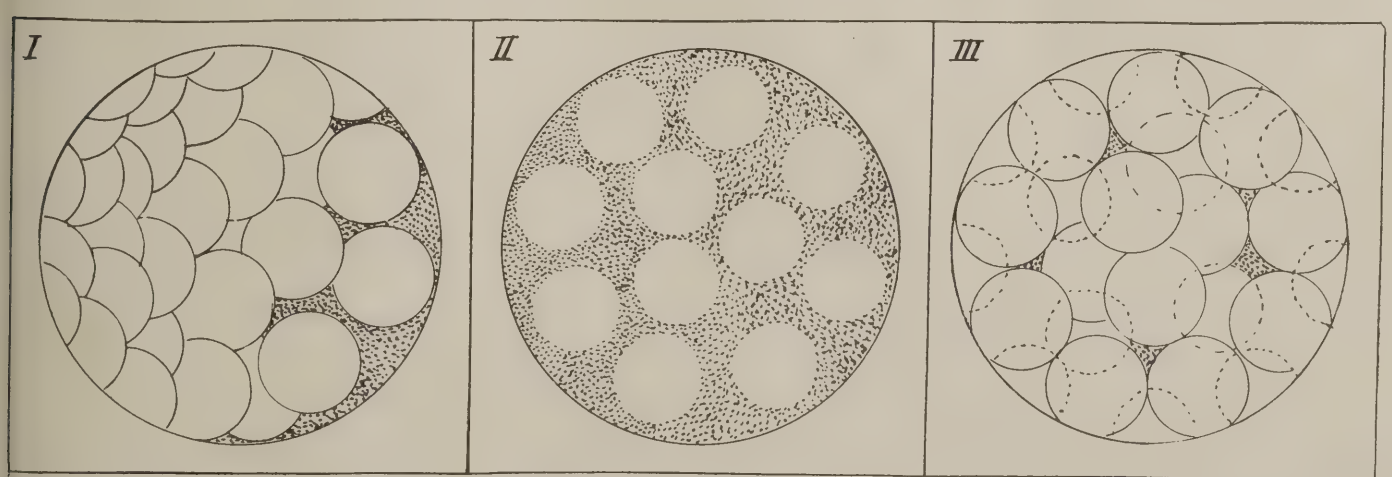
Despite all these facts, white lead and oil remained for years the sole medium of exterior paint protection and, though chemists were aware of the need for improvement and searched incessantly, it was not until the middle of the last century that anything vital was discovered. In 1850 a Frenchman named LeClaire developed the fact that zinc oxide was not only much whiter than white lead but that it was much harder.

Technically, zinc oxide is produced by burning the zinc metal in a furnace, the fumes being brought into contact with oxygen to form a fine powder. These powders are of various degrees of fineness, the fluffiest being known as White Seal, which is used in the manufacture of high-priced enamels, the Green Seal for mixing with paint, the Red Seal for other commercial purposes, and so forth. We shall deal here, of course, only with the Green Seal.

Zinc, the abbreviated term used generally in the trade, is like lead in that it is also stable in its chemical composition. Owing to its great fineness, however, it naturally bulks larger, a pound of the dry form being about three times greater in volume than a pound of dry lead. As a consequence of this fluffiness it tends in a comparative sense to take up considerably more oil, something like twelve gallons to the hundred pounds of zinc as against about five and a half gallons for the same amount of oil to reach the same degree of easy brushing consistency.

Still another characteristic item in connection with zinc is its imperviousness to gaseous fumes. White lead is quickly turned yellow when used as a paint in industrial areas, where sulphur and other gases are prevalent, but zinc will retain its whiteness. Its chemical stability has already been referred to, but it should not be thought of as inert in the sense that barytes, silica and other extenders of mixed paint are, or it would not absorb oil.

At this point it might properly be asked why, with greater whiteness and hardness than white lead, not to mention immunity to yellowing from gas fumes and equal chemical stability, zinc would not constitute a good substitute for white lead. The answer lies in the fact that zinc oxide, like white lead, possesses inherent shortcomings, though in Belgium and France paint made with no other pigment than zinc is being used and giving good results. However, not only is the climate of those countries some-



This illustration shows three idealized drops of paint greatly magnified. Dots indicate areas protected by linseed oil alone; large circles represent white lead, small circles zinc. Fig. 1—Note how lead particles tend to pile up and spread out irregularly. Fig. 2—Note thin protection afforded by scattered zinc particles alone. Fig. 3—Note how zinc particles tend to spread out lead particles more evenly and fill up interstices, giving a smooth, even, solid film that wears long

what different from ours but their painters are not so thoroughly wedded to linseed oil as a liquid vehicle.

In this country zinc oxide beaten up with linseed oil, turpentine and drier, as white lead is, would form a hard film, but a thin, inelastic one. With the expansion and contraction of temperature changes, such a coating would lack the necessary "give," resulting in cracking and scaling. Not only that, but the surface thus left would be a poor one for repainting—a proper job would call for expensive removal down to the bare wood with a blow torch, thus doubling the cost of doing the work over.

Common sense, therefore, dictates a compromise. If white lead is soft and powders off in a year or two with exposure, necessitating fresh renewal, why not add to it a proportion of zinc oxide which will harden the paint coating and, in the case of a white paint job, make it still whiter? Moreover, where the house is located near industrial plants, it will retard the yellowing action arising from smoke fumes and, above and beyond all, will add a year to two years to the life of the paint protection.

This is exactly what the mixed paint manufacturers contend and have contended for the past fifty years. They differ only in the relative amounts of zinc to be added to the white lead; some adhere to a formula introducing from 15 to 40 per cent, some for as high as 50 per cent. Some maintain zinc and white lead alone are sufficient, others go further and add small quantities of other pigments. In the fine points of these differences we are not here interested, the important feature is that all of this contention is directed toward the same goal —the prolongation of the life of the paint once it is applied to the surface.

It should not be assumed from this that in order to secure a white lead paint reinforced with zinc it is necessary to purchase a ready mixed paint. Zinc can be secured put up in paste form in the same way that any of the standard brands of white lead are —all ready for addition to it and reduction to brushing consistency with boiled oil, turpentine and drier. The question of how much to add is settled in northern climates at about 25 per cent zinc and 75 per cent white lead. Farther south, where lead needs greater reinforcing, due to more protracted and intense exposure to sunlight, the proportions should be nearer half and half.

Another reason for the desirability of adding zinc to white lead not yet touched upon lies in the fact that to secure the fullest degree of protection a paint film must be closely knit. To illustrate, visualize one drop of paint out of a brush full applied to a board and highly magnified. You will see fixed therein by the linseed oil, molecules of various shapes, the round ones representing the carbonate of lead and the flat, oval ones zinc oxide. Applied as separate paints, the white lead will tend to pile up unevenly, according to the manner in which the paint is brushed out, whereas, the zinc will do the opposite, spreading out to a thin film full of gaps between particles.

Either zinc or white lead and oil alone, therefore, present deficiencies when it comes to maximum, uniform resistance to exposure. Translate either condition into terms comprising the entire painted exterior of a house and see what happens. Rain, snow, wind and sun beat against it three hundred and sixty-five days in the year, seeking and searching out those little gaps or irregularities which the naked eye can never see but which the paint chemist can. Eventually, with the linseed oil wearing away, the elements will work through the weak spots and the destruction of the rest of the film becomes rapid. But combine the two pigments and you have a smooth but solid resistance to weather wear about as durable as human ingenuity can devise.

To sum up, the chief cost of painting lies in the labor incident to application, the paint materials necessary being a negligible percentage of the total expense. Since all paint must perish in time, let us face the fact and turn our efforts to making what we have last as long as possible. Therein lies true economy, personal and national, for well-painted property means dollars gained for the individual and millions added to the wealth of the country. If zinc added to paint that is inherently short-lived will prolong its effective span—well, why not do it and so be money in pocket and patriotic at the same time?

Fire Prevention Week

AS a partial answer to the fact that 1922 recorded the highest fire losses ever known, it has been decided that the week of October 8, 1923, shall witness the most important event in the entire history of fire prevention. This will take the form of the first National Fire Prevention Exposition with which will be associated an International Fire Prevention Congress.

When, at the annual meeting of the National Board of Fire Underwriters last May, President John B. Morton stated that American fire waste for the preceding year had reached the prodigious sum of $521,000,000, his hearers were startled to realize that the loss total had risen beyond even that of 1906, when $350,000,000 in values were destroyed in the single San Francisco conflagration, and was mounting steadily.

The Fire Prevention Week Committee of that great technical and educational body, the National Fire Protection Association, now took the subject up for special consideration and called a meeting that was largely attended by representatives of many national organizations. All agreed that efforts should be concentrated upon four main objectives, namely:

(1) Suitable and adequate building codes where there are none;

(2) The teaching of fire prevention in all schools;

(3) The inspection and protection of schools, hospitals, churches and state institutions;

(4) Systematic inspection by a bureau of fire prevention formed in the regular fire department.

Following this meeting, there was worked out a novel means for promoting these ends and a sub-committee "on Exposition Co-operation" was appointed by General Chairman Fleming and placed under the special chairmanship of H. L. Miner, manager of the Fire Protection Division of the E. I. du Pont de Nemours Company. The sub-committee now is concerned in the most promising effort ever made in this field, namely, an exposition and a congress, both of which will be held during Fire Prevention Week at the 71st Regiment Armory in New York.

This joint activity is based upon the fact that the general public and the architects, contractors, manufacturers, bankers, credit men, municipal officials and other groups must be drawn together through some means that really will visualize to them the imminence of fire hazard, the terrible price which it exacts in life and property, and the simple means by which it may be obviated.

To this end the large floor space of the armory will be made a place of really thrilling interest during the week in question.

Through the co-operation of many organizations and the employment of many novel means of presentation, there will be impressed upon the visitor a cumulative effect of the minute-by-minute recurrence of fire destruction and its disastrous results.

Even more important will be the plain demonstration that most of this destruction is entirely preventable. The exposition will not be theoretical but constructive. It will present hundreds of devices and processes that have been tested, with reference to eliminating their natural fire hazard, or to demonstrating their ability to protect from fire, by the searching investigations of that entirely non-commercial institution, Underwriters' Laboratories. No manufactured products will be permitted on exhibition that have not successfully withstood such tests.—*Fire Prevention Record.*

American Buildings Withstand Earthquake

AMERICAN steel concrete buildings in Tokyo and Yokohama withstood the earthquake shock and are in good condition, according to a cable from Assistant Trade Commissioner G. C. Howard at Kobe. Officials of the Department of Commerce expressed gratification over the first practical demonstration of the effectiveness of the new so-called earthquake-proof factories and office buildings which have been constructed within the past three years. There are about six of these buildings in Tokyo.

Kinks from the Job and Office

By V. L. SHERMAN

Send in your kinks—give the benefit of your experiences to the other fellow as well as get the benefit of his. NATIONAL BUILDER pays $5.00 for every kink published.—The Editor.

Better Grade Markers for Concrete

"ONE of the most exasperating difficulties of placing concrete," writes M. P. H., of Elizabeth City, North Carolina, "is the continual disappearance of markers indicating grade. Usually stakes are set so that the top of the stake is the grade or finished surface of the concrete. In the hurly-burly of actual placing, these stakes get covered up and are most difficult to locate, and are frequently entirely lost.

"To remedy this defect the writer used the scheme outlined in Fig. 1, with fine success. Old iron pipes were used for stakes, and their tops driven 1/10 inch below level of finished floor. In the tops of these pipes rough wood stakes were

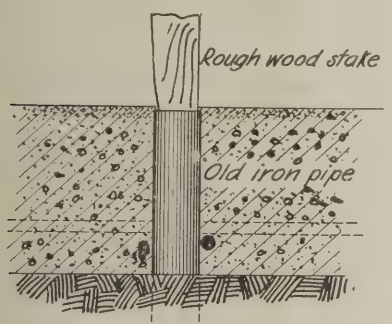


Fig. 1—Permanent grade stake

placed merely as markers. From time to time these marker stakes were kicked loose or broken off by barrows, etc., but it was a simple matter to renew them. Having the exact grade always available it was easy to place not only the body but the top dressing as well in one operation, thus securing the added strength of the top dressing, integrally placed, as well as the assurance that it could never separate or flake off.

"The particular job that this scheme was originated for was heavily reinforced and the iron stakes were aids in placing and securing the steel, holding and locking it in such a manner that it was practically impossible for the 'roughnecks' to kick it out of place when placing the concrete.

"Of course this method is only warranted where floors of considerable area are placed, but modifications of it that will mark grade are valuable for even a small job."

The Ins and Outs of Octagons

R. W. L., of Santa Monica, California, writes: "I noticed in the NATIONAL BUILDER for August a method for obtaining

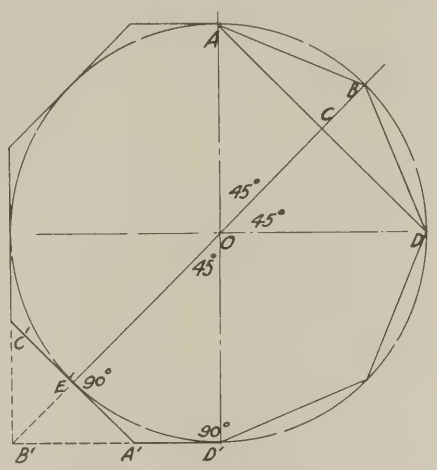


Fig. 2—Inscribed and circumscribed octagons

the length of one side of an octagon. The method I use (see Fig. 2) has more to do with right triangles, but it seems to me a simpler method and more easily understood than that by B. H. W."

Fire-Stoppage in an Ice Chute

CARE must be exercised in all cases of liability to fire spread. The following letter from A. C. H., of Springfield, Massachusetts, may interest some. "The enclosed sketch, Fig. 3, shows a pipe coming down to a ventilator. In this case the

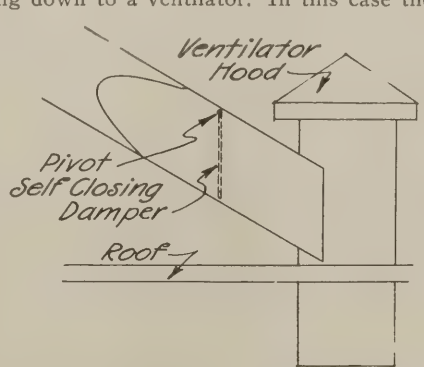


Fig. 3—Crushed ice chute with fire check

pipe was meant to carry crushed ice. It goes through the roof of the garage which is a part of the plant. Before the ventilator was put on the pipe was objected to because of the fear that flames might shoot up through the pipe if a truck caught fire. It is now arranged so that the ice comes down the chute, pushes against a pivoted damper, which opens from the weight of the ice, and then closes. In case of fire the flames would go up through the ventilator."

A Simple Anchor Bolt Sleeve

A NOVEL sleeve for anchor bolts is submitted by A. R. L., of Laconia, New Hampshire. See Fig. 4. "A simple sleeve for anchor bolts which is cheaper

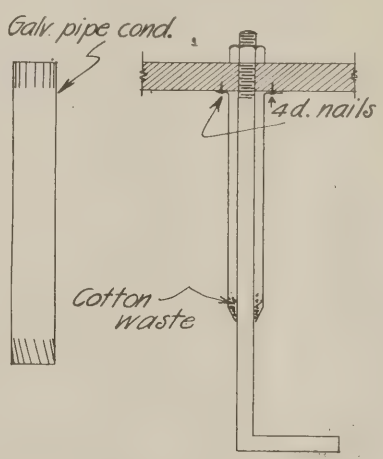


Fig. 4—Galvanized conduit anchor bolt sleeve

in material and labor than gas pipe is shown herewith. It is made of galvanized conductor pipe that is twice the diameter of the bolt and about three-quarters as long. The pipe is cut with a hack-saw, slit with snips, and the ends bent over."

Lathing in Sections

WE have a profound sympathy for anyone who has to lath, plaster, or paint ceilings. Hence the regard for the letter sent by A. G. H. "Lathing the ceiling of a room is always slow and tiresome, especially if one is not accustomed to it. There should be some better way of getting the lath nailed on which would prevent constant use of the hammer overhead. I will offer one method, but do not wish to claim it as the best. I would appreciate the opinions of others. I use a couple of

4-inch boards, cutting these either the length of the room, or dividing them up in sections. The lath can be nailed to these on the floor. Afterwards these boards can be nailed to the joists where the lath should be nailed."

Keeping in mind that the lath bears some relations to the rigidity of the building what methods can the readers suggest?

Setting Window Frames in Rustic Houses

A. B. R., of Albany, California, thinks he has a "better and cheaper way of setting window frames in rustic houses

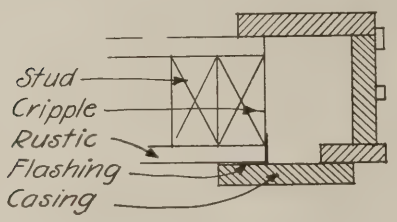


Fig. 5—Weatherproof rustic window frame

than the average. See Fig. 5. Cut the rustic flush with the cripple, and then nail a common flashing tin over the ends of the rustic before setting the frame. This makes the frame weather-proof at a very small cost."

Handy Slippers

FROM L. L. M., of Seattle, we have: "I am sending in a little kink which I use quite often. When placing hardware after floors are finished a carpenter must wear soft slippers, remove his shoes, or take some precaution against injuring the floor. This is something of a bother. I find that the cover of a lock carton (of which there is always a good supply on

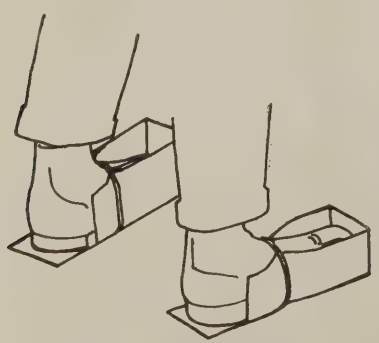


Fig. 6—Handy slippers

hand) serves the purpose. As in Fig. 6 take the cover, break one end down, and place it over the shoe with the loose end under the heel. Clamp it on with a rubber band or a short section of inner-tube. This is economical, easy to apply, and does as well as anything else." Another case of good use for gone tires. They are even making rag rugs from casing fabric.

An Out-a-Door Bed

H. S., of Emporia, Kansas, writes: "By the accompanying sketch, Fig. 7, I am showing an arrangement for a bed on

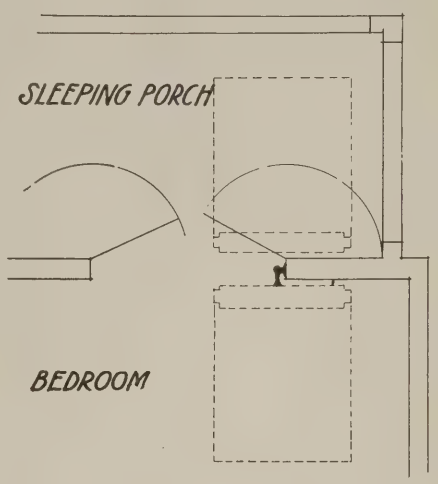


Fig. 7—An out-a-door bed

a sleeping porch which can be used in an adjoining bedroom." (We hope that H. S. hasn't succumbed to the rigors of winter, the mosquitoes, or the rain.)

"A pair of doors swinging onto the sleeping porch is the most convenient, although a single door will do."

Paper Pier Forms

C. N., of Atlantic, Massachusetts, writes: "I have noticed the problems on the page called 'kinks' in your magazine, and I have a stunt with cement piers that proves very satisfactory. In making cement piers for small buildings that are not over two feet from the ground I dig the holes and fill them up with cement within about a foot of the top. Then I take heavy building paper, roll it up, leaving the hole the diameter that I want, and set the roll down on the cement I have put in the hole, and have the top of my roll even with my batter boards. Fill the roll with cement and pull dirt up around the outside. It saves making wooden forms, and we do not have to go back and take the forms off as we had to do with the metal ones that bolted together."

Fatigue in Wood Fibre

K. L. writes in to ask if any information can be given on the effect of vibration in timber. We presume he means "does the effect of alternate stresses in wood fibre produce fatigue as it does in metal?" He cites an article he has recently read in regard to telegraph posts, wherein it was stated that the swaying of the wires between the posts did not produce weakness in the timber.

In metals there is an inner structure that reacts to constant alternating strains. It is called fatigue, sometimes crystallizing. The part may break completely where no flaw was detected, and this happens more often in very cold weather. To prevent such action there are various combinations of metals provided which will hold up longer than others. But in wood the inner structure is altogether different. Does any reader know of such action in timber?

Child's Pen

THERE are a number of baby pens on the market, some collapsable and some rigid. We have here a photograph of one which is larger than the usual, see Fig. 8, which being designed by a woman takes account of all the finer points in structure. The writer says he finds them popular and a means of filling in spare time.

The pen is 6 feet long, 2 feet, 3 inches

Fig. 8—Child's pen

wide, and 3 feet to the top of the rail. The deck stands 4 inches off the floor, and the whole is mounted on strong castors. The construction can be seen in the photograph. One-half-inch doweling was used and the whole frame sanded so as to insure against slivers.

The popularity of this pen seems to come in keeping the youngster off the floor in the cold months, safe from harm at all times, and in providing a veritable monkey-cage in which he may play monkey to his heart's content and learn to walk. The mother who designed the pen says that the pen can be rolled from room to room, or out on the porch, that it saves the baby from floor-drafts, and that in two cases babies have learned to walk without suffering a single fall because they have something to cling to while learning.

By using screws in the upper frame the pen may be taken down and stored.

Cistern Cover

"A GOOD way to make a cover for a cistern when the side walls and top are concrete," writes D. R. H., "is shown in the enclosed drawing, Fig. 9. After the side wall forms have been filled, a dishpan, right side up, is placed in the exact center on top of the form. The pan is next filled with concrete, puddled well,

Fig. 9—Dishpan form for concrete cistern cover

and two U-bolts inserted for handles. Thus weighted down the cistern is finished off, and the whole left to cure. When the time comes for removing the forms the concrete within the pan is lifted out and set aside and the forms removed. The cover is then removed from the pan and placed in the opening as shown. Two distinct advantages are found in this method. No time is lost and no materials are used in making the forms for the cover. The pan can be used again. The top fits snugly, is flush with the top, is sightly, and there is no danger of its dropping in. There is no danger of a child's pushing the cover to one side to look in out of curiosity."

Fabricated Buildings

IT always takes a few of the wiser ones to save us from ourselves, so whenever our tendencies are to kick over the traces it is well to remember what the traces are for. This has to do particularly with building codes and the disregard so often paid them by those who can least afford to take chances.

A recent upheaval in local school-board affairs called the attention of this department to the use of fabricated buildings.

In this particular instance the building committee of a school board, which boasted a lawyer but no architects, ordered "portable buildings" for school purposes. That seating capacity had to be provided at the least possible expense was their excuse for side-stepping the village board's negation. The permit issued called for compliance with the local building ordinance, and at the very start operations were halted because of unsuitable foundations. The political angle, possibly, drew in the ordinance committee to survey the plans, and these were condemned as not proof enough against fire or wind. To ease matters the ordinance committee attempted to furnish recommendations which would be acceptable if strictly complied with, but the building committee of the school board replied they would be built as delivered or not at all, due to lack of funds. (They might have added lack of brains, but it didn't occur to them.)

We merely wish to point out that in every community, no matter how strict the guard, there are times when a competent architect or builder is lacking in spirit if he does not help to prevent such abortive building. There are portable schools sold that are really worth while, but since the size of the building mentioned was 39x84 feet, and the strength through over-spaced studding, no bracing, and no sheathing, was extremely deficient, a couple of photographs were furnished the board to show how foolish it was to buck a sensible ordinance. (If their body had had the services of some architect, which should have been as welcome as it would have been freely given, they would never have been in such a quandary. The photographs, shown here in Figs. 12 and 13 are examples in framing. Fig. 12 shows the wreck of a church in Chicago. The storm which blew over everything that wasn't nailed down instead of up was a 60-mile wind. Such a wind is not at all uncommon, and the building less than a year old simply de-fabricated. The vestibule and steps are quite secure. The other photograph shows what happened to a small home during a real tornado. In this case there would have been ample excuse for divorce of parts, but you will notice that, as a whole, it is still all there. If space permitted we should like to show a picture of a two-story brick residence that suffered in a tornado which visited the outskirts of Cincinnati a few years ago. The trees are all gone, every pane of glass is gone, the shingles are gone, but the roof and the structure are sound.

© Underwood & Underwood

The occupants of this house were unhurt, although many lives were lost in the tornado

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Garden City M. E. Church wrecked by sixty-mile wind, 1923. Note the unbroken windows

Of General Interest

Rebuilding a Nation

HOUSING operations as America knows them, even in war times, appear insignificant beside the scope of the building operations Japan now faces in reconstructing the great cities of Tokyo and Yokohama, says the Far Eastern Division of the Department of Commerce. The latest reports place the destruction of buildings in the devastated areas at 316,000 in Tokyo, or about 71 per cent of the total number in that city, while in Yokohama out of the 85,000 buildings standing before the disaster only 15,000 are left intact. The destruction in the outlying districts may bring the total of buildings destroyed up to the half million mark, the large majority of which are homes. This number, added to the housing shortage that existed in Japan before the earthquake, will necessitate the construction of dwelling houses on a large scale. Since Japan normally looks to the United States for about 60 per cent of its lumber requirements, it is expected that the demand for American lumber during the reconstruction period will be very heavy.

The price of Japanese lumber delivered c.i.f. Yokohama or Tokyo has been approximately 20 per cent higher than that of similar qualities of American lumber, and American freight rates have been favorable. The American market also finds itself in a favorable position as regards delivery. It often happens that the Japanese importer can secure delivery from Pacific ports to Yokohama in less time than from Hokkaido, Karafuto, or even from the northern provinces of Japan proper.

Japan's preference for American lumber, aside from the price consideration, is due, perhaps, more than anything else to the fact that our lumber is more nearly like that of Japan proper than the product of any other country from which it draws wood supplies. This similarity of wood makes it possible for Japanese builders to substitute American lumber for Japanese in all building projects. in fact, American lumber is now specified in many instances.

The principal lumber imports of Japan consist of fir, hemlock, pine, and cedar, about half of which is imported in large squares of from 12 to 24 inches and a lesser amount in small squares of 4½x4½ inches. The large squares are worked up in the local mills and carpenter shops into the different shapes required for general building, while the smaller squares are used as studs for holding up roofs and for supporting beams. The large squares are very popular among builders in Japan and can only be obtained from America.

The only competition confronting the United States in trade in this class of lumber will come from other parts of North America, as the Siberian, Manchurian, Hokkaido, and Saghalien or Karufuto pines and cedars are all of inferior quality and accepted only as substitutes.

At the time of the disaster stocks of lumber in Japan were quite large, especially in Kobe, Osaka, and Tokyo. Assuming that all the stocks in Yokohama and Tokyo were destroyed, it is seen that there is still a fairly good supply on hand for immediate emergency purposes. The real demand will come when the permanent construction of the devastated areas commences.

It is reported that plans are being made to rebuild Tokyo and Yokohama along modern lines, conforming with the construction of the Western World as closely as practicable. The possibilities along this line are somewhat limited, however, owing to the necessity of always keeping in mind the probability of a recurrence of earthquakes.

© Cook's Travel Service, from P. & A. Photos

All the world has been deeply interested in the recent earthquake in Japan. At this writing full details have not yet reached this country. The fate of many a famous building is still in doubt and much interest attaches to the relative stability of the buildings of native construction and those of modern steel framing. The photo on the left shows a famous shrine of Japan, at Kama Kura, the resort city of Japan, and it is typical of Japanese native architecture. The photo on the right shows the type of construction in Japan before the steel frame building was introduced. Japanese buildings were able, with this apparently flimsy construction, to escape serious damages from many earthquakes in the past

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For the Builders' Library

"Tribune Tower Competition." — The Chicago Tribune recently conducted a competition, open to architects of the world, for a design for "the most beautiful office building in the world." One hundred thousand dollars in prizes were offered. Two hundred and sixty architects from twenty-three different countries competed. This was the first time that a competition was ever held for a private building, and it is the largest contest of the kind ever conducted. The complete story of this competition, the program, the report of the jury of award, biographies of the winners, honorable mention, a list of the architects competing and reproductions of the two hundred and sixty drawings in full-page size are included. The book contains 680 pages and is 8¼x12¾ inches in size. It is bound in heavy burlap covered boards with thick maroon end sheets printed in gold. The book was published for presentation to the competing architects, but because of the wide interest in the competition, the edition was enlarged and copies offered at what is said to be less than cost, $5.00. It is recommended as a study in the designing of the skyscraper, and as such is the only book of the kind published. The publishers are The Tribune Company, Tower Competition, 7 South Dearborn Street, Chicago.

Heating and Ventilating Guide. The American Society of Heating and Ventilating Engineers' Guide, 1923 edition, has just been published for this year. It is Vol. 2 in the annual series. This book contains reference and design data useful in the planning and construction of modern heating and ventilating installations, prepared from the society's transaction, the investigations of its research laboratory and the practice of its members. It also includes a catalog and reference data section containing essential and reliable facts concerning modern equipment. The book is 6¼x9¼ inches in size and contains 399 pages, including a roll of membership of the society. It is bound in blue cloth and the price is $3. Copies can be purchased from the publishers, the American Society of Heating and Ventilating Engineers, 29 West 39th Street, New York City.

"Personal Liability for Preventable Fires."—This is one of a series of bulletins by the National Lumber Manufacturers' Association, International Bldg., Washington, D. C., on "Lumber and Its Utilization." The bulletin discusses the matter of liabilities for fires, suggestions in case of fire, cites ordinances, laws and regulations and pleads for more fire resistive and efficient construction. The bulletin is of standard 8½x11 size, for easy filing and contains 16 pages. It is supplied free upon request.

"Southern Pine Manual of Standard Wood Construction," a new ninth revised edition of this book, published by the Southern Pine Association, has just been issued and now is ready for distribution to architects, engineers, builders, retail lumber dealers and others interested in the publication. This new manual is said to be the most complete and up-to-date timber handbook in existence. The new ninth revised edition retains the entire

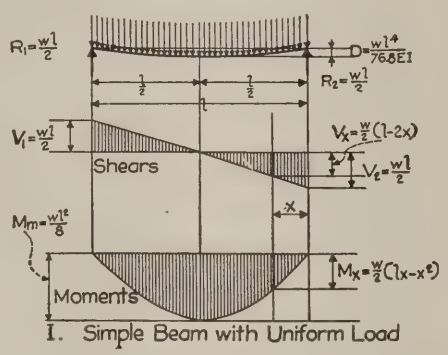

Illustration from page 59 of "Southern Pine Manual of Standard Wood Construction"

text of the eighth edition, but it has been revised and enlarged. The new material added in the ninth edition includes: Latest requirements for floor and roof loads of the largest cities distributed over the various sections of the country; new material on wood block floor paving and construction; details for design of light wood roof trusses on spans up to 125 feet; timber working stresses and design factors based on recent comprehensive tests of commercial Southern pine and safe working loads for bolted, nailed and spiked connections.

The new Southern Pine manual is claimed to contain the information needed to solve every-day problems in wood construction and the price of $1.50 per copy has been fixed for sale of the book.

"Studies on Building Height Limitations in Large Cities." Hand in hand with zoning and building restrictions—subjects of prime importance these days in every city—goes that of the height of buildings. Tall buildings have such an effect upon the light and air received by neighboring structures, as well as on property values, that the larger cities are beginning to question the economic value of the skyscraper to the community. The zoning committee of the Chicago Real Estate Board investigated this subject and their findings and proceedings have been published in book form by the board. The book contains 299 pages, with colored insert, is 6¼x9¼ inches in size, is bound in cloth and priced at $2.60 postpaid.

"Estimating Building Costs," by Charles F. Dingman. Here is another book on estimating and it is one that will be appreciated by the contractor, builder, architect and appraiser. It is not a "data book" nor does it treat exhaustively any of the various factors entering into construction work, such as earth and rock excavation. Instead, the volume "is intended for the less experienced man, to train him to analyze every construction job into its component parts, to apply his cost data, adjusted to conditions, to the several necessary operations and thus to calculate a price that will approach the actual cost of doing the work as closely as is humanly possible. Each subject has been treated at sufficient length to enable the reader to get a clear insight into the factors involved, their relative importance, and the methods to be employed in estimating their costs." The method of calculating the total quantities of materials and labor needed to complete the job multiplied by their individual costs to determine the estimated cost of the operation is the principle employed by the book, but the author recommends using the unit quantity cost system as a check just the same. Price lists are not included in the book because of their fluctuations and because manufacturers' catalogs can supply them better. The book stresses the importance of estimators paying more attention to the method of obtaining and recording data on the basis of production per man-hour rather than on that of the money cost per unit. The book is 4¼x7 inches in size, contains 240 pages, and is bound in black flexible imitation leather covers. It is published by the McGraw-Hill Book Co., Inc., 370 Seventh Ave., New York City.

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R. Duncan	8.00	8	00
		48	00

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Operating Expenses:			
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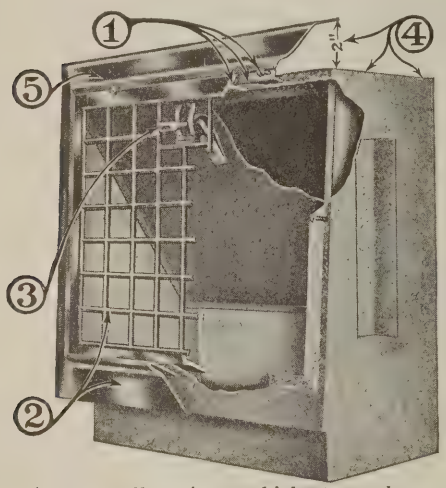
New Devices Methods and Improvements in the Building Industry

Make Wall Register That Won't Streak

THE accompanying illustration is a reproduction of one in the new catalog of the Rock Island Register Company, Rock Island, Illinois, and shows the construction of their newest device, a wall register, which, they claim, will not streak the walls. In (1) the patented expanded slip-joint connection which extends all around the box is shown. This prevents the air from escaping and streaking the walls; (2) shows the steel frame and removable steel grille which permit the discharge of the full capacity of the pipe; (3) is a malleable lever, positive in operation, and can be operated by either the hand or foot; (4) the galvanized tin-lined box, with floor line, wall line and recessed top collar for easy and accurate setting. The 2-inch trimming space around the box is for quick and correct setting of the register; (5) shows how the grille is easily fastened or quickly removed for cleaning by removing the two large oval head bolts.



A new wall register which the makers claim will not streak the walls. See text for explanation

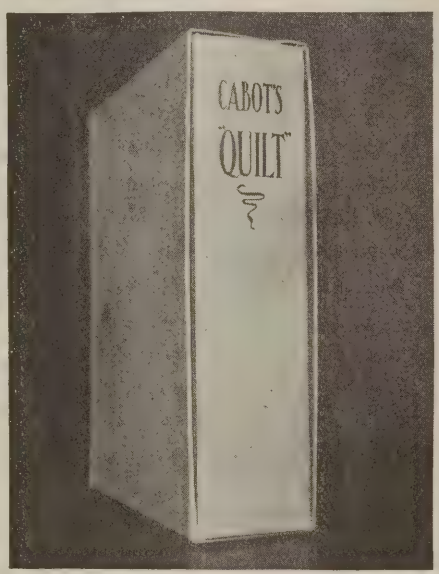
The company's catalog illustrates and describes their entire line of registers, grilles and miscellaneous heating equipment.

"Shingles and Spanish Tile of Copper"

THE Edwards Manufacturing Company, Cincinnati, Ohio, and the Detroit Copper & Brass Rolling Mills, Detroit, Mich., have collaborated in the publication of this booklet, which displays their various patterns of copper shingles and roof fixtures. The cover of the booklet is in folder form, properly indexed, to fit in an ordinary letter file. The booklet is printed in three colors and contains 16 pages.

Cabot's "Quilt"

THE illustration below is not of a book nor is this heading the title of a book. Both refer to an unique carton which Samuel Cabot, Inc., manufacturing chemists, Boston, Mass., have devised for presenting samples of the well known insulating material by this name which they manufacture. This carton consists of heavy board covers, very much like those of a book, with cloth reinforced backbone, and with pockets in the sides, in which are slipped samples of Cabot's Quilt itself by means of stiff paper tongues so that they can be removed.

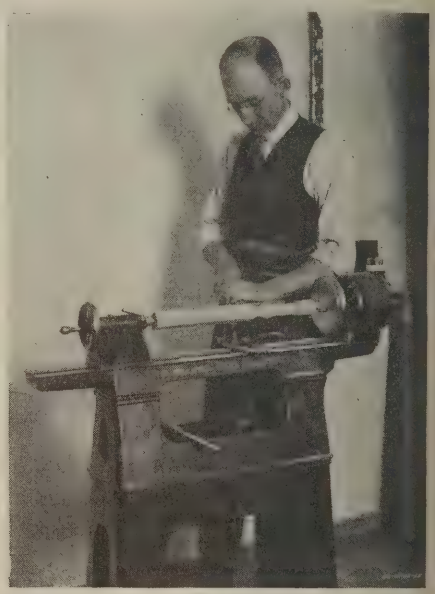


A carton of samples

There are five of these samples, each 5½x 7⅞ in. in size and with a combined thickness of 2¼ in. The samples are of Cabot's standard single, double and triple-ply Quilt, the waterproof double-ply Quilt and asbestos Quilt for fireproofing. This carton, resembling a book, is contained in an open edge box or case much like those in which expensive books are often sold. Thus the Quilt samples can take their place on the office library shelf, where they are kept clean and undamaged, for showing to the client. The architect, contractor, builder and dealer interested in insulating and sound deadening materials will find such an exhibit helpful in getting business. The overall size of the case is 6½x9 in.

A New Single-Speed Bench Lathe

A NEW, single-speed, portable, six-inch bench lathe has been placed on the market by J. D. Wallace & Company, 1401 West Jackson Boulevard, Chicago, manufacturers of portable bench machines. This machine is probably the smallest electrically driven woodworking lathe made and is designed to do the smallest turning operations which make up a great share of the work in many woodworking plants, and to do them speedily and more economically than they can be done on larger machines.

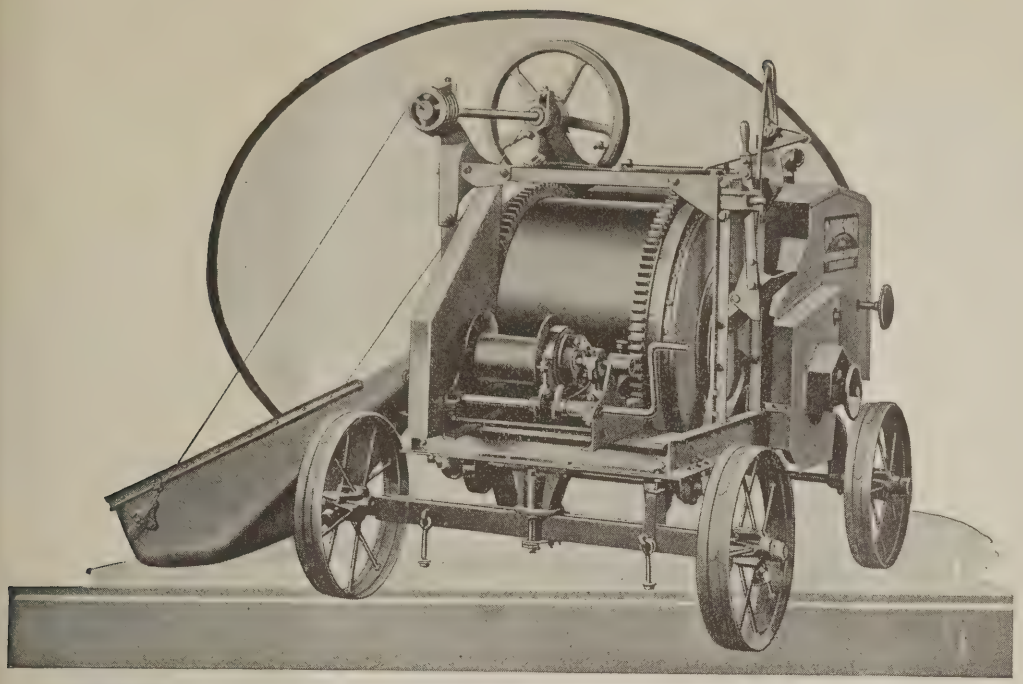


A new portable bench lathe

This little high-speed lathe is intended for work up to six inches in diameter. It clears five inches over the tool rest and seven inches on the face plate, with full 24 inches between centers.

After extensive experimental work the manufacturers have set 3400 r.p.m. as the scientifically and practically correct speed for work up to six inches in diameter.

The machine weighs but 203 pounds and can be moved at will, close to the bench, to get proper light on the work, etc. At the same time it is said to be heavy enough to stand rigidly without vibration. Its height over all is 46 inches and length over all is 40 inches.



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Mixes both mortar and concrete! Hoists.

FIRST of all the Koehring Dandie is a strongly constructed concrete mixer, but because of its mixing action it also mixes mortar. No changes needed! Always ready to go on either a mortar or concrete job. That's getting fullest use and return out of equipment investment. And in addition there is a light duty hoist attachment.

At the same time you are always ready to do a concrete job—foundations, silos, footings, culverts, sidewalks, drives, alleys, etc. The Koehring Dandie is the dependable light mixer — built with Koehring construction. Big volume production and standardization keep price down — gives you a dependable concrete mixer, interchangeable for mortar mixing at a light mixer price.

Capacities

4 and 7 cu. ft. mixed concrete. Gasoline or steam. May be equipped with low charging platform, batch hopper, automatic water measuring tank, light duty hoist, steel or rubber tires.

KOEHRING DANDIE

KOEHRING COMPANY

Manufacturers of Concrete Mixers and Cranes, Excavators and Power Shovels

MILWAUKEE, WISCONSIN

Sales offices and service warehouses in all principal cities.

Foreign Department, Room 1370, 50 Church St., New York City;
Canada, Koehring Company of Canada, Ltd.,
105 Front Street East, Toronto, Ontario;
Mexico, F. S. Lapum, Cinco De Mayo 21, Mexico, D.F.

KOEHRING COMPANY
MILWAUKEE, WIS.

Please send me Koehring Dandie Mixer Catalog No. 12 and give full information on interchangeability for mixing concrete and mortar.

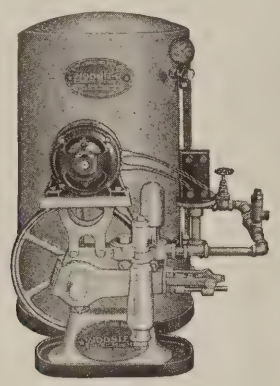
Name _____

Address _____

_____

New Water Supply Equipment

WHEN the famous old Indian, Geronimo, was shown the wonders of civilization on a trip to Washington, D. C., so the story goes, he was asked what of all the twentieth century marvels he saw impressed him most. Expecting that he would say the electric light or steam engine, automobile or phonograph, his hosts were surprised when he pointed to a water faucet in the wall of a building. The instant command of water, under pressure, was to the old man from the parched plains the greatest gain over nature that the white man ever made. Today the use of running water for any and every necessity is a "modern convenience" that is becoming as common on the farm and in small town centers as it is in the city. Every builder should know something about water supply systems.



A new water supply outfit with capacity of 120 gallons per hour

Bulletin G, "Hoosier Water Service" issued by the Flint & Walling Manufacturing Company, Kendallville, Indiana, contains some practical information on this subject and in addition describes the various equipment for water supply systems manufactured by this company. They announce a new unit with unusual specifications. The complete outfit has a galvanized surface. The motor controller is completely enclosed and meets insurance requirements. It opens and closes both wires and is adjusted to cut out at 35 pounds maximum pressure. A Wagner motor of repulsion induction type and ⅛-h.p. is furnished. One pint of light or medium grade lubricating oil fills the crank case and one filling is sufficient for one year where the pump is given ordinary usage. The capacity of the unit is 120 U. S. gallons per hour and 200 r.p.m.

The Flint & Walling Manufacturing Company maintain an engineering staff for their customers' use. They suggest that any builder contemplating the installation of a water supply service consult with them regarding the installation which will adequately meet the requirements at a cost commensurate with the service rendered.

The Waterproofing Handbook

THE sixth edition of "The Waterproofing Handbook," published by The General Fireproofing Company, Youngstown, Ohio, is now ready for distribution to architects, engineers and contractors who have waterproofing problems to meet.

This is a reference book, 8½x11, 72 pages, conveniently arranged for the quick location of the answer to any waterproofing problem.

The book is subdivided into four distinct parts, each section dealing with related problems of waterproofing. Section I, Sub-Structural Waterproofing, deals with the waterproofing of foundations, basements, pits, tanks, pools and containers and other structures subjected to hydrostatic pressure and dampness. Section II, Super-Structural Waterproofing, gives the methods and materials necessary for rendering walls and roofs proof against weathering and dampness, for the stainproofing of cut stone and for the preservation of stucco, brick and concrete walls. Section III, Cement and Wood Floor Preservation, describes the different methods for hardening, dustproofing cement and wood floors, and for accelerating the setting of cement floors. Section IV, Technical Paints and Coatings, deals with the different ways of rendering walls, floors and containers proof against acids and oils; for the protection of structural steel and galvanized surfaces from rust and timbers from dry rot and decay; for bonding new concrete to old, etc.

Complete specifications are given for all problems and the book is so completely indexed that the location of any problem or specification is a matter of seconds.

The book is for free distribution to architects, engineers and contractors who are confronted with waterproofing or dampproofing problems.

Dual Valve to Eliminate Trap Troubles

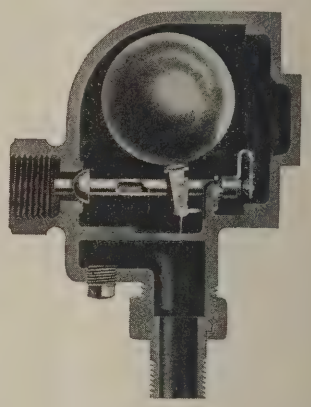
THE Heating & Power Appliance Company, 200-210 Pleasant Street, Milwaukee, Wisconsin, have developed a trap or valve for use on vacuum, vapor and atmospheric systems of heating called the Dual Valve that eliminates, it is claimed, all trap troubles.

The principle and construction of the Dual Valve as shown by the illustration is a somewhat radical departure from past and present appliances of the kind.

The operation is controlled by condensation or condensed steam, which is a natural element, and eliminates thermostatic members that are controlled by temperatures. The medium of control of power is a seamless phosphor-bronze ball float.

The Dual Valve is installed on each unit of radiation, and at points where supply main is to be drained of condensation. The valve placed at the outlet of each radiator insures condensation of all steam or vapor that enters the radiator. This results, it is claimed, in transmitting to the room, in which radiator is installed, the full value of all fuel energy that enters radiator.

The manufacturers explain that the construction of the Dual Valve permits the ready elimination of air through the hollow valve stem, which is opened to the atmosphere, until such time as the steam or vapor has filled the radiator or other unit of radiation and entered the body of the valve. The steam or vapor then comes in contact with the bimetallic strip at the top of the hollow valve stem. The heat causes the stem to contract and close the opening, so that no steam is permitted to make its exit to the return line. The system, meaning all radiators and piping, now being free of air, and filled with steam, will condense the steam in units of radiation, which flow into the body of the Dual Valve, causing the float, which lifts the seat from place at the bottom of the Dual Valve, to rise, permitting the condensed steam to return back to the boiler or pump, depending on the type of system on which the Dual Valves are installed.



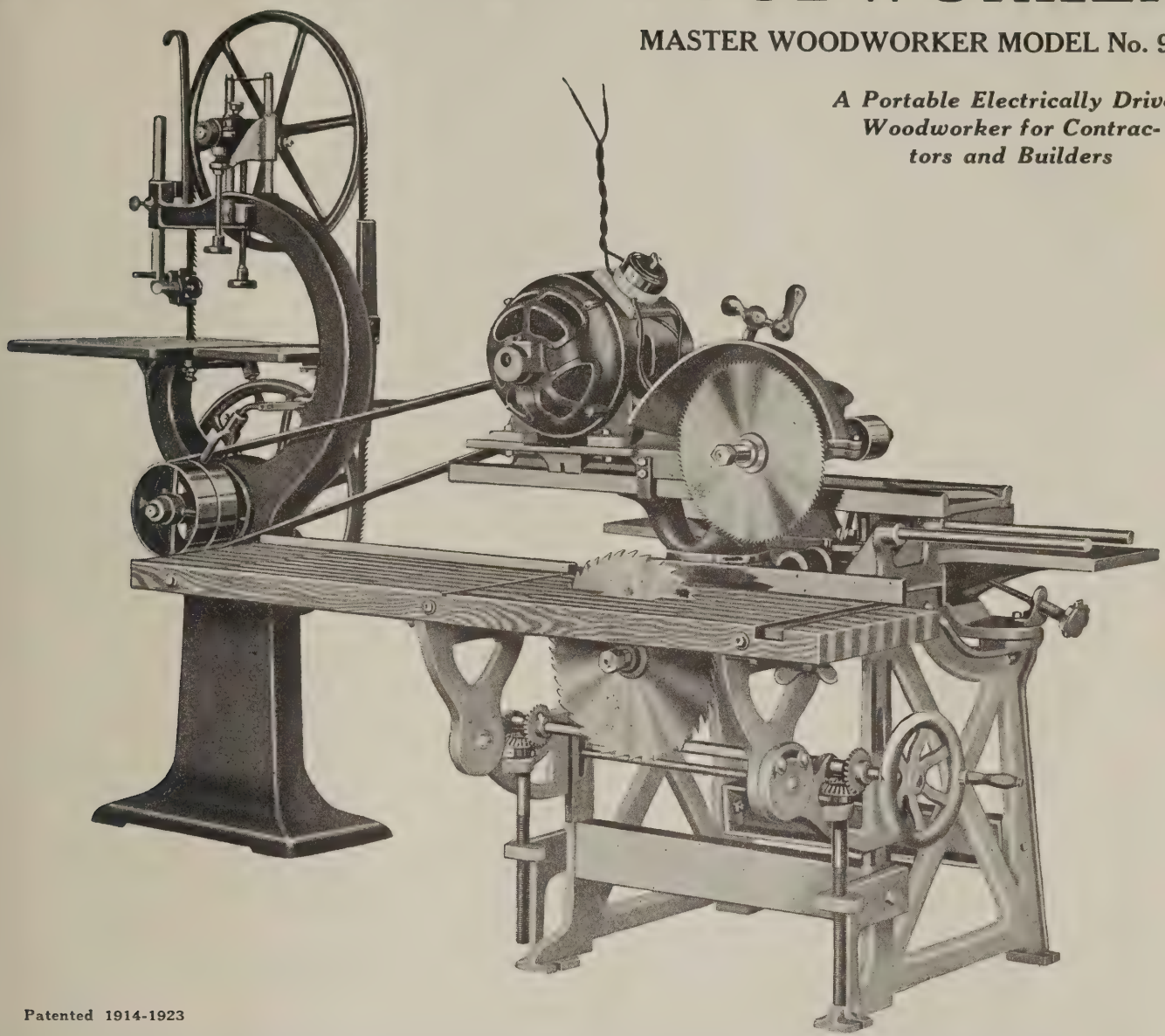
"Dual Valve" trap for use on vacuum, vapor, and atmospheric heating systems

The Dual Valve derives its name from the fact that it actually has two valves or traps incorporated in its construction. The hollow valve stem with the bimetallic strip is a trap itself, and will function efficiently and without trouble, it is claimed, in the event of any rupture to the float medium or control. However, the manufacturers specifically advise that the Dual Valve is of a float type construction and that the hollow valve stem arrangement with the bimetallic strip is only an auxiliary arrangement primarily for the purpose of eliminating air, but adds additional assurance in the elimination of trap troubles.

THE "MASTER" WOODWORKER

MASTER WOODWORKER MODEL No. 9E

A Portable Electrically Driven Woodworker for Contractors and Builders



Patented 1914-1923

THE MASTER WOODWORKER IS THE BEST LABOR SAVER ON THE MARKET

A Combination of Real "Power" and "Portability"
Not a "Saw Rig"—But the "World's" Best "Woodworker"—"The Master"

The Master Woodworker is so constructed that by loosening four bolts the machine may be divided into four parts, the heaviest of which weighs 200 pounds. It is nothing more than a two-man job. For interior work the machine cannot be excelled, as when table is removed, same may be taken through a 2' 6" door, and taken from room to room. This alone should be convincing—it does not take a machinery mover to take it from job to job, but merely a Ford pickup box.

The Master Woodworker Is PORTABLE

When building you can put up a shed and have a temporary service put in, and make all frames, and stair work, cut joists, fence boards, flooring, siding, bridging, rafters, roof boards, shingles, and all other cuttings on the job. The finishing work cut, and dado door jambs, casings (square or mitred), cut threads, risers and wedges. Rout out door strings, cupboard doors, drawers, and shelving, fit doors and sash and mortise locks, there is no cut on the job that cannot be made by the Master Woodworker.

Sawing by hand is a waste of labor—trying to do the work with old style machinery is a waste of money.

In keeping up with Progress, the best in PORTABLE woodworkers has been designed by practical engineers.

THE MASTER WOODWORKER for Builders and Contractors is actually the Simplest and the Best that human ingenuity could possibly devise.

How many times have you paid for a **MASTER WOODWORKER?**

Do you realize that it will pay for itself on the first job? In fact you are paying for it every day in your hand sawing hours. Why not stop the waste? Successful contractors and lumber dealers do not use hand saws.

Why do you?

The **MASTER**—the fastest and best Woodworker on the market—can be bought with a small payment down. Put it on your pay roll!

Make it pay for itself and collect some real profits.

There is big money in contracting with a **MASTER WOODWORKER.**

CATALOG ON REQUEST

The Master Woodworker Manufacturing Co., Inc.

612 BRUSH STREET **DETROIT, MICHIGAN**

Insulating a Stud Wall

IN all frame residences the studs are set on 16-inch centers. The Flaxlinum Insulating Company, St. Paul, Minnesota, recommend a special application of their insulating material so as to increase its effectiveness in the house of frame construction. The strips of Flaxlinum are cut 16½ inches wide with a flange or

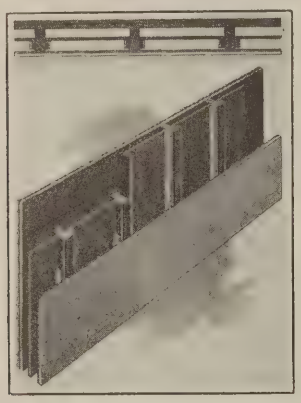


Fig. 1—How flanged strips of Flaxlinum are applied between the inner and outer wall coverings

score near each edge. The long, flanged sheets are forced in between the studding half way back to the outside sheathing. This divides the air space between the studding into two parts, as shown in Fig. 1. This gives, too, added surfaces to resist heat and cold, which is not the case when the insulation is placed next to the sheathing or next to the plaster. The sheets of insulating material, thus flanged

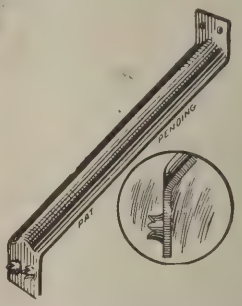
Fig. 2—Sheets of insulation, 16½ inches wide, matched at the corners, are butted into place between the studs half way between the outside and inside edges of the 2x4s

Fig. 3—Strips of lath are then used to nail the flanges to the studs, giving the finishing touch to the job

and placed half way between the outside and inside wall coverings, produces a better job of insulation than the same material would if applied either on the inside or outside of the studding. The flanged strips take up no room and do not add to the thickness of the wall.

Claim Steel Bridging Is Cheaper Than Wood

STEEL floor bridging is becoming widely used in the construction of houses and apartments. According to the Graf-Worch Manufacturing Company, 117 West Frankfort Street, Columbus, Ohio, it has proved itself to be stronger, better and cheaper than wooden bridging. They state that it can be installed for about two-thirds of the price of wooden bridging, but that it was difficult at first to convince contractors of this fact, though now the majority of contractors realize that the labor necessary in putting in wooden bridging is the greatest part of their expense.

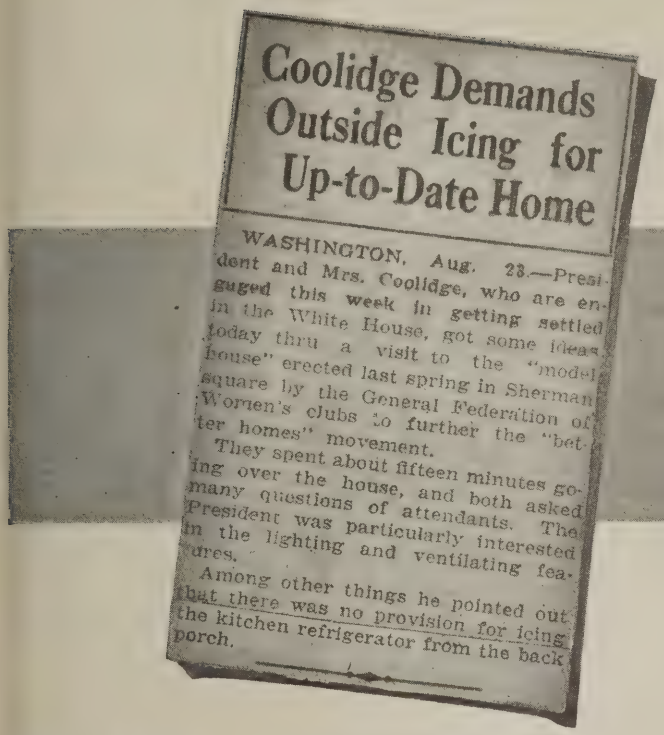


Note the longtitudinal rib and the burred holes in this steel floor bridging

"Hercules" steel floor bridging, as the company's product is called, is made of 18-gauge steel dipped in asphaltum base paint which prevents deterioration of the steel due to moisture. The bridging is rigid because of a longitudinal rib which gives it great compression and torsional strength. It cannot slip when in position because of the burred holes projecting into the wooden beam. Every piece of bridging holds to its full strength because there is no weakening as in the case of wooden bridging where the pieces are often split by the toe nails driven in.

Standard sizes of Hercules steel floor bridging are as follows: No. 1 for 8x2 joists and No. 2 for 10x2 and 12x2 joists on 16-inch centers; No. 3 for 8x2 joists and No. 4 for 10x2 and 12x2 joists on 12-inch centers.

A building in Columbus, Ohio, on which steel floor bridging was used



Coolidge Demands Outside Icing for Up-to-Date Home

WASHINGTON, Aug. 23.—President and Mrs. Coolidge, who are engaged this week in getting settled in the White House, got some ideas today thru a visit to the "model house" erected last spring in Sherman square by the General Federation of Women's clubs to further the "better homes" movement.

They spent about fifteen minutes going over the house, and both asked many questions of attendants. The President was particularly interested in the lighting and ventilating features.

Among other things he pointed out that there was no provision for icing the kitchen refrigerator from the back porch.

He Must Have Seen a

HERRICK
Outside-Icing Refrigerator

There are still thousands of people who do not know what an essential convenience the Herrick Outside-Icing Refrigerator is, but the above Associated Press dispatch, broadcasted throughout the country, is bound to create some interest among home owners and prospective home owners.

For the convenience of contractors and builders we have prepared a set of blue prints that will fit your vest pocket, making them handy to carry, and on short notice you can plan and recommend the Herrick Outside Icing.

If you are building to sell, equip the home with this modern convenience, show the above clipping to your prospects and you will have made a long step toward giving them this service.

Write for complete information

REQUEST FOR BLUE PRINTS

Herrick Refrigerator Company,
1500 River Street, Waterloo, Iowa.

Please send me free a set of Blue Prints, in the handy vest pocket size, showing dimensions and various openings necessary for HERRICK Outside Icing.

Name of Firm.....

Address .....
(Contractor or Builder)
(Scratch out one)

Name of individual.....

City .....

HERRICK REFRIGERATOR COMPANY

1500 River Street, Waterloo, Iowa

When writing advertisers please mention National Builder

Painting Houses by Machinery

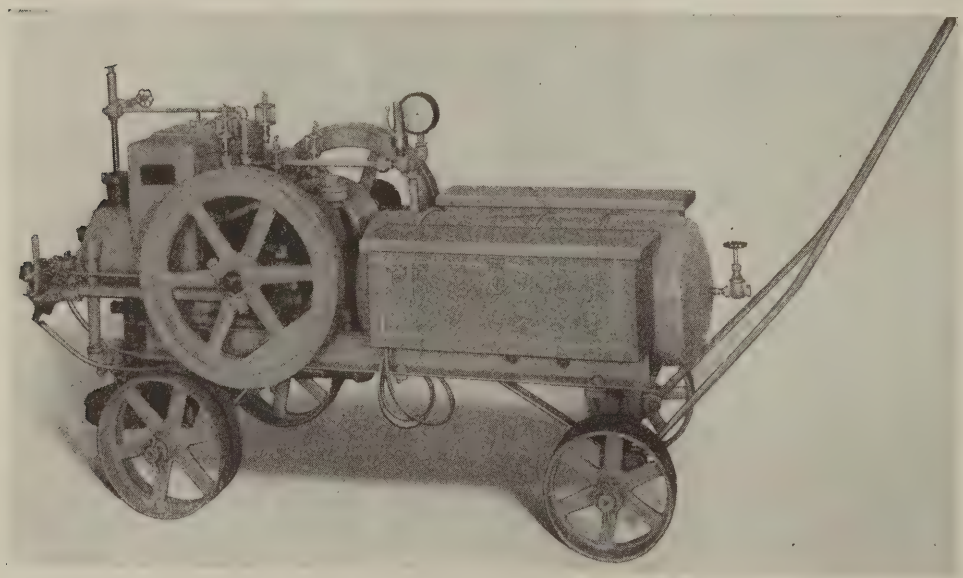
EVERYTHING else is done these days by machinery, so why not painting? Couldn't paint be applied under pressure by a spray, more uniformly, quicker, smoother and generally better than with a bunch of bristles? The Spray Engineering Company, 60 High Street, Boston, Massachusetts, think so, and they are

Painting a house with engine-driven air compressor

prepared to demonstrate the efficiency of the "Spraco" method which is done with the pneumatic painting equipment which they manufacture in a wide variety of devices to meet every requirement from the painting of hulls of ships to the finest industrial finishing.

Contractors and builders who are largely concerned with the painting of houses and other small buildings use the model 11-B gun, which is lighter and has smaller openings and is therefore better adapted for finer work than some of the company's other equipment. This 11-B gun can be furnished with an electric heating attachment for the purpose of warming the air and material at the gun, necessary when extra heavy viscous materials are used. An agitating attachment can be used when cold-water paints and other liquids requiring continuous stirring are applied.

Compressor units are supplied for installations where a supply of compressed air is not available. The illustration shows a portable air compressor driven by a gasoline engine. It is compactly built and low in construction and rigidly secured to a steel truck. All power is transferred direct; i. e., without belts, chains or gears. The outfit is automatic in operation, both air pressure and speed remaining constant for any desired setting. The engines are four-cycle horizontal, water-cooled; the compressors, single acting and water cooled.



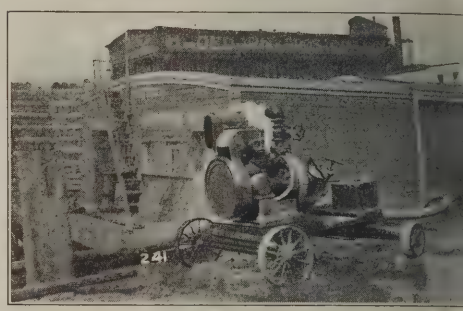
Portable gasoline-engine-driven air compressor for pneumatic painting device

New Portable Pumping Outfit

A NEW portable pumping machine that has received favorable recognition by the contracting field and public utility companies is the "Penway" pumper, manufactured by the Pennsylvania Pump & Compressor Company of Easton, Pennsylvania. It is also recommended as a stationary outfit or for use in close quarters, for it occupies about one-fourth of the usual floor space required by a pump of its capacity. The illustration shows the "Penway" pumper complete with hand primer and ten-foot suction hose, mounted on truck.

The capacity of the pump is 350 gallons per minute at 20 feet head. The capacity will vary throughout the range of total head produced, delivering approximately 50 gallons per minute at 35 feet total head. The total weight of the pumper without the truck is 550 pounds. The complete outfit as illustrated weighs 780 pounds. The overall dimensions of the complete unit are 30 by 19 inches by 36 inches high.

The attainment of these unusual features, it is claimed, has not been gained through any sacrifice of ruggedness, for the "Penway" pumper is extraordinarily substantial. Its compactness and light weight are the result of a better and mo



Portable pumping outfit with hand primer and 10-foot suction hose, mounted on truck

rational design. There are no gears, pulleys, belts, not even a coupling; nothing to get loose, shear or get out of line.

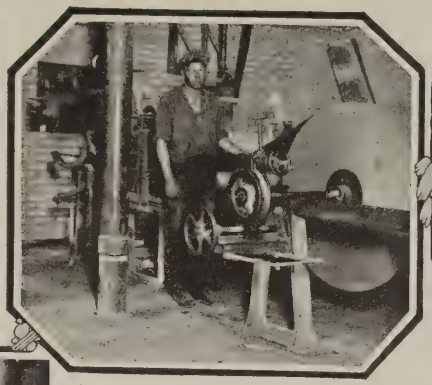
The "Penway" pumper is of the single stage, side suction type with open impeller, the back and edge of impeller and interior surface of the casing are accurately machined to template, insuring the proper uniform clearance between the rotating and stationary elements.

The engine shaft extends into the pump casing and the impeller is mounted upon its end. The portion of the shaft extending into the pump and exposed to the action of the liquid being pumped is covered with a bronze sleeve to prevent corrosion and is renewable if necessary.

The engine is the "New-Way" five horsepower air cooled gasoline engine manufactured by the "New-Way" Motor Company of Lansing, Michigan. It is of the four-cycle type, equipped with the Bosch high tension magneto and impulse starter, making the engine extremely easy and sure to start. The cylinder is cooled by the "New-Way" patented method of cooling directly by air with all of the unnecessary parts of the water-cooled method eliminated. This method, it is claimed, is simpler, safer and far less bothersome. There are no frozen cylinders, no circulating pump to clog, no piping nor hose to leak, no water to haul, no steaming hopper jackets and no water to boil away and cause the engine to overheat. The "New-Way" is designed to deliver its full power in any climate without overheating.

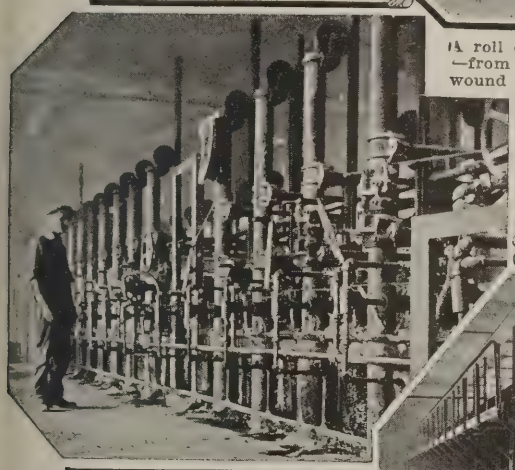
Where---and How---Reynolds Original Asphalt Shingles Are Made

As asphalt is unloaded from freight cars it is stacked as shown in the storage yards. A small section of the thousands of containers piled in the yards is shown.

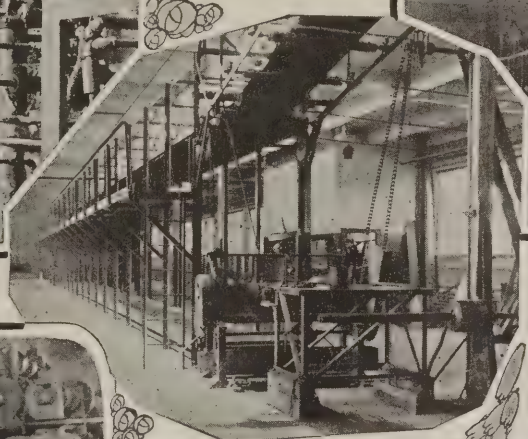


A roll of felt on the unwinder—from this machine it is unwound and passes over steam heated drying rolls and into the saturating and coating kettles.

Part of the battery of pumps, that pump melted asphalt from the melting kettles to saturating and coating kettles.

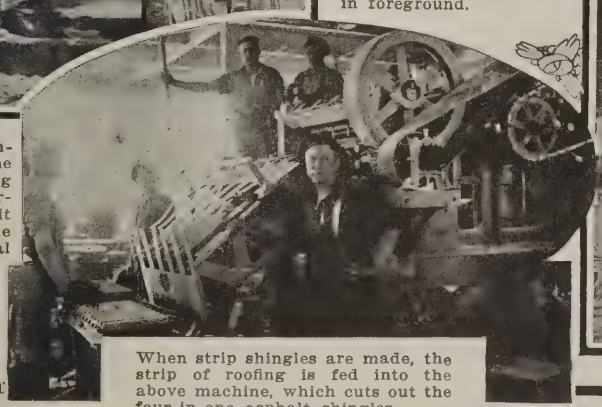


Saturating kettle. The dry felt passes through asphalt in kettle for a certain period of time until right point of saturation is reached.



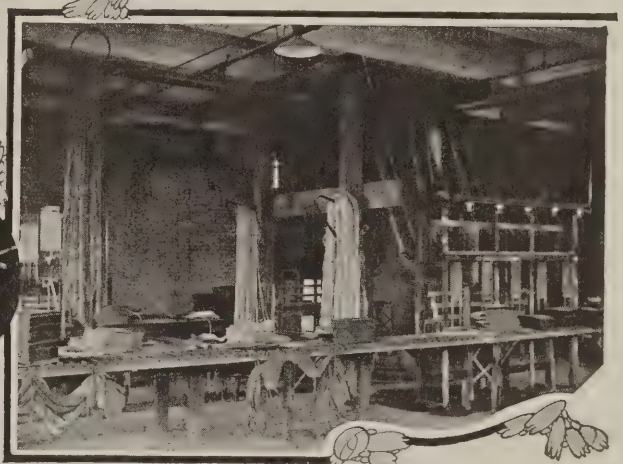
At the far end of this conveyor is the crushed rock hopper from which crushed minerals are sifted on to the saturated and coated felt. The mineral surfaced roofing then rides on this conveyor, allowing the crushed minerals to become thoroughly imbedded in the asphalt coating.

Conveyors and drying looper. Finished roofing goes from conveyors to drying looper and hangs in perpendicular loops. Rolling machine shown in foreground.

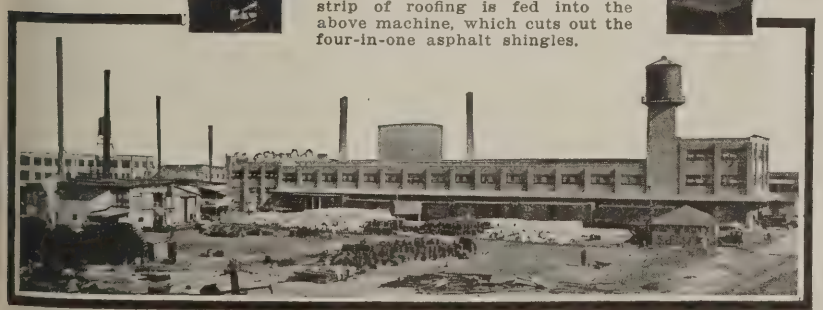


The individual shingle cutting machine is fed with the long strip of mineral surfaced roofing and it slits and cuts the strip into individual asphalt shingles.

When strip shingles are made, the strip of roofing is fed into the above machine, which cuts out the four-in-one asphalt shingles.



Partial view of the individual shingle stacking machines. As shingles are cut by machine they slide down chutes into automatic stackers, from which they are taken and bundled and tied.



The Home of Reynolas Shingles

FOR twenty-three years, the Reynolds Shingle Company has stood pre-eminent in the composition shingle field.

Liberal policies—an unquestioned product and fair prices—have developed this enormous plant which houses the finest equipment obtainable for the specialized building of time-tested composition shingles.

Reynolds Shingles are sold by all leading Lumber Dealers

H. M. REYNOLDS SHINGLE CO.

Grand Rapids, Michigan

A concrete mixer combined with a Ford truck. It can be rapidly transported between jobs and moved about on the job

"Mixermobile" Speeds Up Concrete Work

THIS photograph was taken on an apartment building job of the Raulf Construction Company, Milwaukee, Wisconsin, which was done without wheeling any concrete for foundation, driveways, sidewalks, or basement floors. The "Mixermobile," manufactured by the Milwaukee Concrete Mixer Company, turned the trick. It pours concrete directly into the forms by running parallel to them. This machine is a cross between a concrete mixer and a Ford truck. The makers state that anyone who can drive a Ford car can operate it. By removing four clamps, the entire mixer mechanism can be detached and the Mixermobile converted into a one-ton truck. Because of the speed at which this mixer travels, it can be transported from one town to another and without delays.

The mixer is operated by the Ford motor, which develops 20 horsepower. The levers are arranged to be operated either from the driver's seat or the ground. The shifting of a lever transfers the power from the engine either to the rear wheels or to the drum. The mixer drum is driven by means of the pinwheel, which embodies features of both the gear and chain drives. Spring suspension and pneumatic tires prevent the mixer from shaking to pieces while being transported.

The capacity of the Mixermobile is seven cubic feet of mixed concrete. A batch can be discharged, it is claimed, in ten seconds.

"The Blue Book of Steel Sash"

THIS is the title the Detroit Steel Products Company, Detroit, Michigan, manufacturers of "Fenestra Steel Windowalls," have given their catalog of their products. The book contains specifications, cross-section drawings and details of construction and installation for the complete line of Fenestra steel sash, together with photographic illustrations of buildings of various types in which installations have been made. Sidewall sash, continuous sash, counterbalanced sash, Underwriters' labeled sash, sliding and swinging doors and Fenestra operating devices are displayed in the catalog section. The book contains 112 pages, size 8½x11 and is attractively bound in blue cover stock.

Announce New Catalog

THE Duro Pump & Manufacturing Co., Dayton, Ohio, announce the publication of their new catalog No. 5 on Duro pump and water systems for both deep and shallow wells and operated by city current, farm lighting plants or gasoline engines. In the back of the book are given diagrams and instructions for installations and technical data of use to the contractor, architect and builder.

Hoist for Heavy Duty New "Novo" Product

A DOUBLE-drum, non-reversible, one-speed hoist, powered with the Novo Type F four-cylinder engine, and known as the Novo D. H. Hoisting Outfit No. 325, has only recently been perfected by the Novo Engine Company, Lansing, Michigan.

This outfit is suitable for pile driving, bridge building, for use in warehouses and yards, or about docks for loading or unloading cargo. In short, it can be used wherever powerful hoisting equipment is needed.

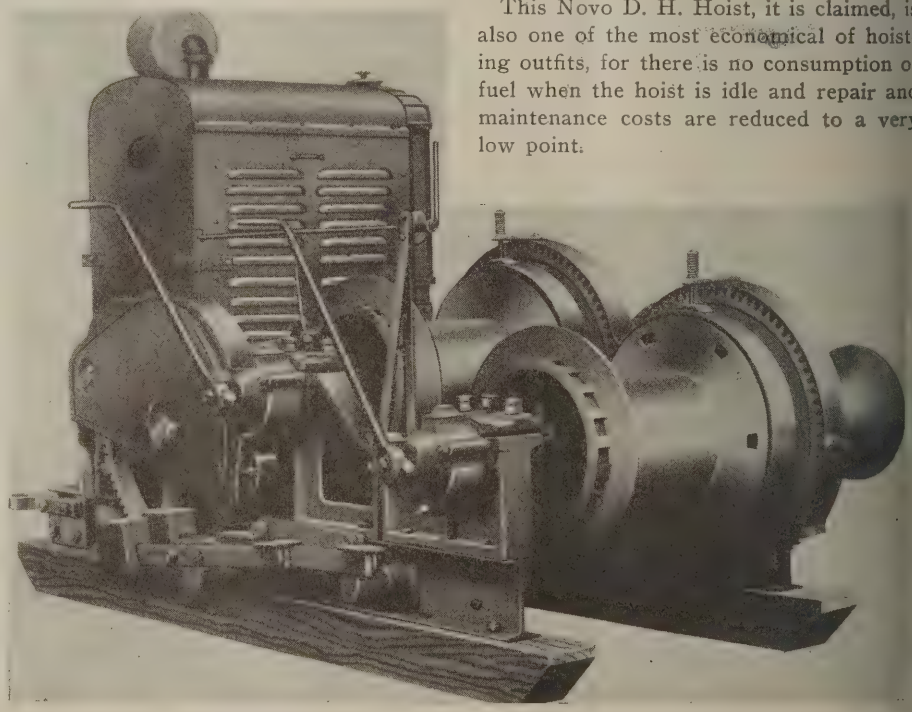
The base is built up of I-beams with cast iron spreaders forming a rigid and firm foundation.

The drums are of the friction type 12 inches in diameter by 16 inches long and carrying 1050 feet of ½-inch cable.

Bearings are lubricated by grease cups. All gears are semi-steel. A powerful foot brake is provided for controlling the drum while lowering or holding loads.

The operator commands full view of the load at all times. The hoist can be moved from job to job at a minimum of time and expense. It occupies little space. It is ready to operate the minute it is placed in position.

This Novo D. H. Hoist, it is claimed, is also one of the most economical of hoisting outfits, for there is no consumption of fuel when the hoist is idle and repair and maintenance costs are reduced to a very low point.



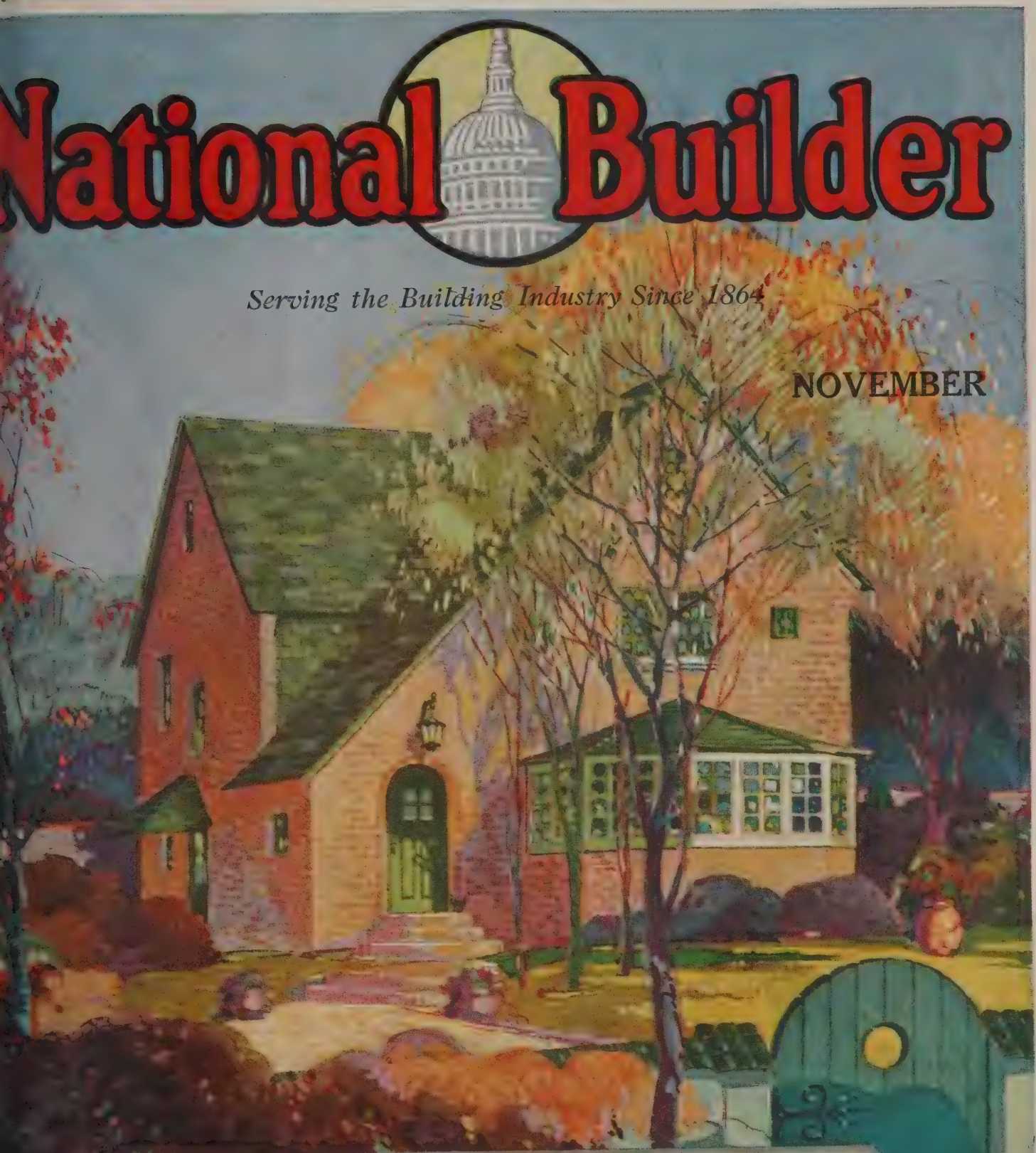
New "Novo" hoisting outfit for heavy duty

The Only Journal Devoted Exclusively to the Contractor-Architect and Builder

National Builder

Serving the Building Industry Since 1864

NOVEMBER



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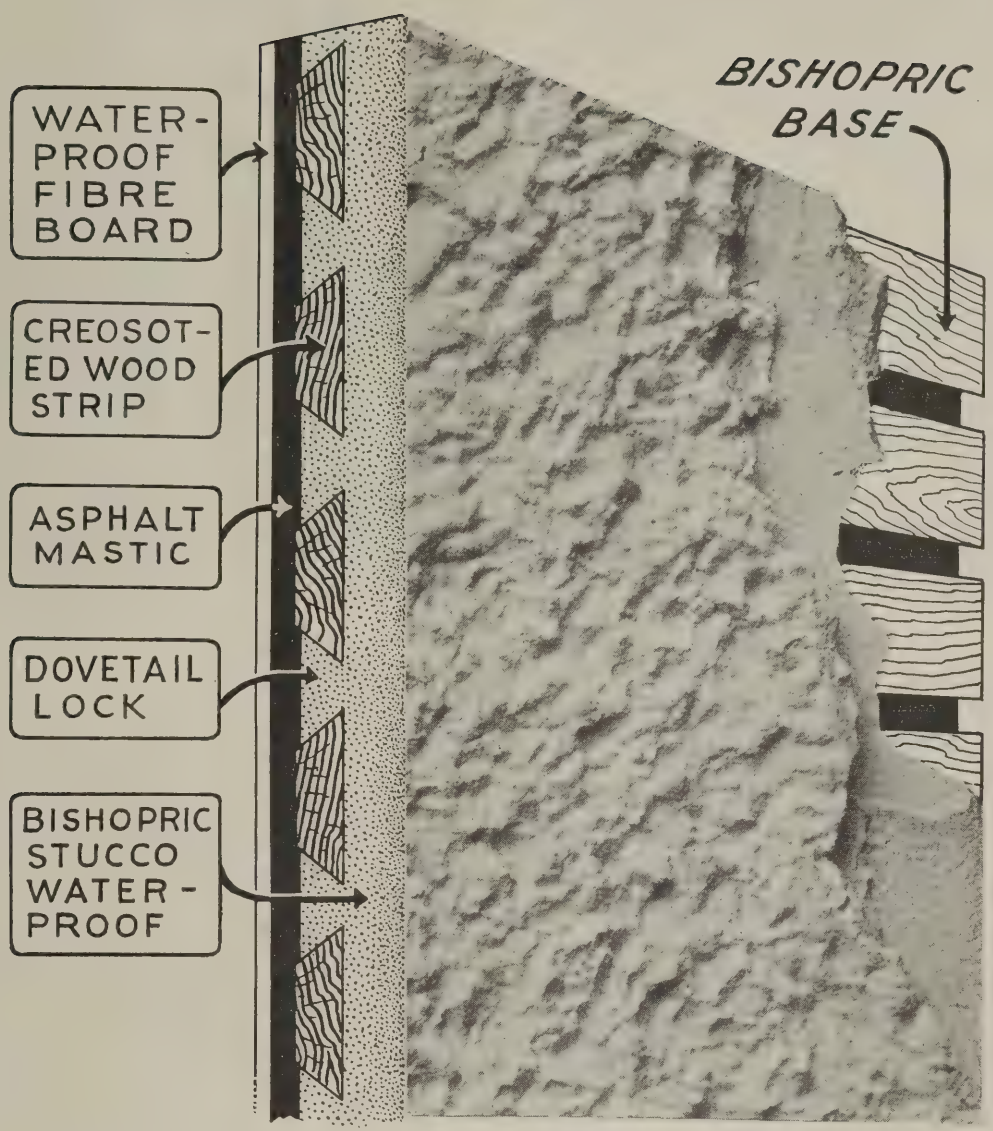

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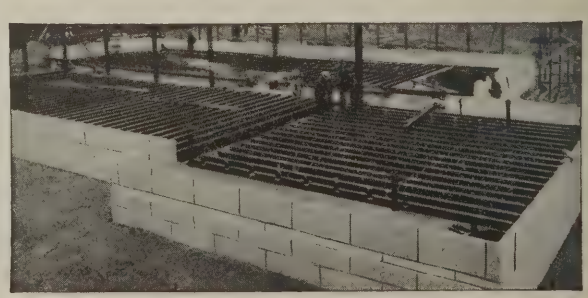

Girls High School, Malden, Mass.

National Builder

December Surprises

SANTA CLAUS is not the only one who is going to hand out some surprises in December. NATIONAL BUILDER has a few of them up its sleeve, too.

FOR example, what would you think the country club house illustrated above could be built for in your community? You will be surprised to learn how little it cost where it was built this last summer, and in the December NATIONAL BUILDER you will get other pictures and plans which will enable you to make rough estimates for the purpose of selling your local country club on building an equally attractive club house.

FOR fifty years two old wooden shacks have occupied a certain location on a certain business street where property is increasing in value daily. Recently they have been torn down and on the site a handsome two-story shop building erected, in which the owners of the shops also live, with sleeping quarters in the rear on the second floor. It is the type of building which ought to be popular in every small town and suburban section, and you will find this article very helpful in getting some of your local merchants or property owners to put up similar buildings.

THE publication of numerous articles about apartment houses in recent issues of NATIONAL BUILDER has led a great many subscribers to write us and ask for still further articles on this subject, which is rapidly growing in importance. Consequently, in the December NATIONAL BUILDER there will be an article about a small apartment building suitable for the average town and small city. This article will be another help to you in getting owners of unimproved property to turn it into an income-producing investment.

THE December NATIONAL BUILDER will, we believe, and we know that you will agree with us, be a fitting close to Volume 66. Have you completed your sixty-sixth year of service to your public? Probably not, for few contractors are that long lived; but when you have, if you do, then you will appreciate the justifiable pride which we take in having rounded out nearly two-thirds of a century of service in the interests of contractors, architects and builders.

WAIT for that December number, and you will find it full of surprises.

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Renewals: Instructions for renewal, discontinuance or change of address should be given three weeks preceding date of issue. Both old and new addresses should be given. Subscribers wishing to discontinue their subscriptions must notify the publisher upon dat of expiration.

Contributions to the editorial pages will be accepted solely on their merits and paid for at the regular space rates. Contributions of timely nature must be in on the 15th of the month preceding date of issue.

Advertising: Space in the advertising pages is sold according to published rates, furnished on application. Copy must be in on the 15th of the month preceding date of issue if proofs are to be submitted for approval before publication. Last forms close on the 23rd of the month preceding date of issue. The publishers reserve the right to reject or revise any advertisement containing statements of doubtful authenticity or derogatory to any building material, accessory or equipment.

Mechanical Requirements: Type size of page, 7x10 in.; half-page, 3½x10 in. or 7x4⅞ in.; quarter-page, 3⅜x4⅞ in. or 7x2⅜ in.; eighth-page, 3⅜x2⅜ in. Screen required, 120 line; reversed plates must be stippled or Ben Day.

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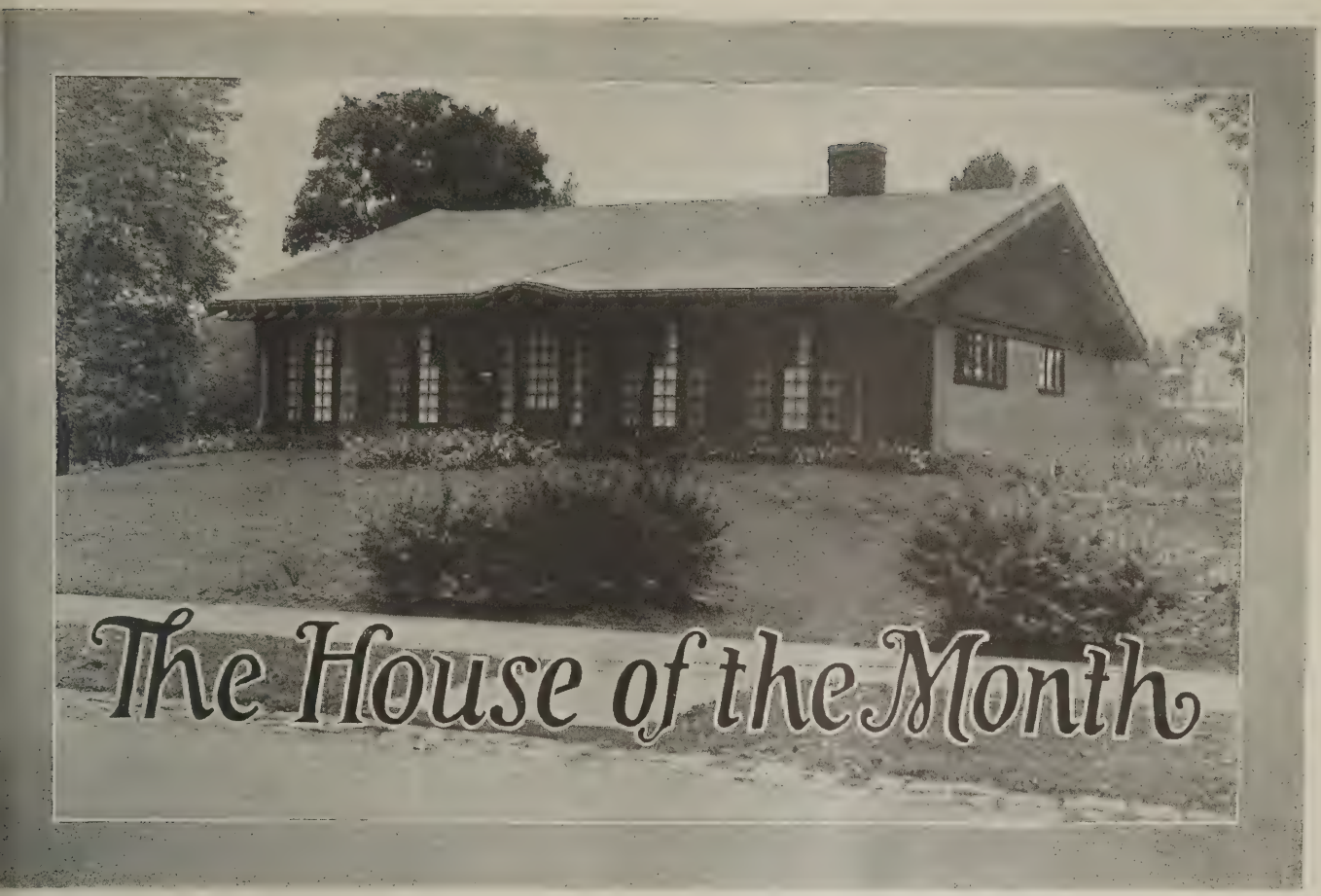
The popularity of the bungalow is due to its umbrageous overhanging roof and the restful appearance of its long, low, horizontal lines



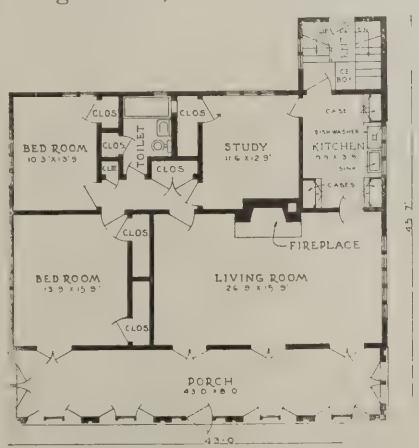
UST how attractive a bungalow can be when it is well proportioned and its details are tastefully orked out, is illustrated by the ictures on these pages and on age 24.

This is the home of Mr. and Mrs. ames Minnick, in Riverside, Illiois. It was designed and planned y William A. Otis, architect, Chiago, and was built by the Southood Construction Company.

There is no dining room in the ouse. One end of the living room used instead and the space saved. or ordinary occasions the end of ie sun parlor is also used and the hotograph on the next page shows ie attractive little painted dining et which the owner has placed iere for that purpose.

The house is of stucco but the oards and battens in the gables are f cypress. The numerous French oors of the sun parlor and in the asement windows are fitted with ietal weatherstrips. The casements re operated by the most modern ardware, which permits placing the creens inside and opening the sash out. The interior trim is of fir, stained and waxed to a beautiful finish. The doors have thick stiles and rails with solid panels presenting deep reveals. The floors are of hardwood and are stained dark. The walls have a rough plaster finish of a light tan color.

The front of the house beneath the porch and living room is not excavated. The basement consists of only that portion beneath the rear bedroom, bath, study and kitchen; and in it, beneath the bedroom, is a storage room, beneath the bath is a large closet with toilet, and under the study and kitchen is the laundry. The photograph of the laundry room shows the wash tubs, a hot water heater, a water conditioner, and the oil burner, which heats the house.



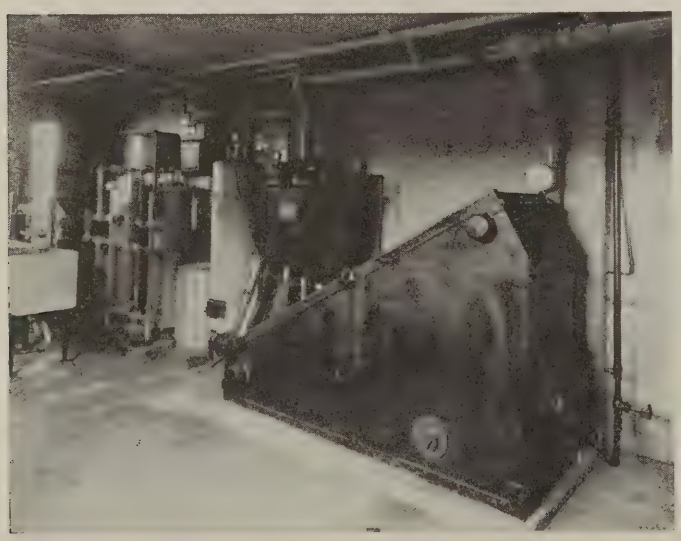
Floor Plan

The house itself is of interest because of the attractive treatment of its exterior details. Notice, for example, the spacing and pattern of the exposed rafter ends and the design of the roof brackets. The roof turns up slightly at the gable ends after the manner of Japanese architecture, from which the motif of this design was taken. The lot is terraced up in the front of the house almost to the level of the sun room floor, giving the bungalow a low appearance from the front which, with its long, horizontal lines makes it the type of house that people stop to look at.

In many localities this seems to be the day of the bungalow. Here is a design which shows how the best points of this architectural style can be handled with very pleasing results.

Inside The House of the Month

One end of the living room is used as a dining room on special occasions



Washtubs, a water conditioner, a hot-water heater and an oil burner form the equipment of the laundry room, which is in the basement beneath the kitchen and study

A painted breakfast set at one end of the long enclosed sun porch, which extends clear across the front of the house, turns this part of the porch into a dining room. The porch is also used as a sun room and, with its numerous doors tightly weather-stripped, it is usable the year around

Looking from the street down the courtyard toward the colonnadeforming the main entrance. This court, flanked by shops on one side and palm-sheltered Egyptian wall on the other, is 150 feet deep and 75 feet wide

"Film Temple" in Egyptian Style

By John Anson Ford

A STRIKING adaptation of ancient Egyptian features to modern architecture nd several especially interesting structural atures characterize the new Hollywood gyptian motion picture theater in Los Anles. This structure, which was designed r the presentation of films in high-class shion and is more luxurious in its apintments than many legitimate theaters, as constructed by Meyer and Holler, of os Angeles, formerly known as the Milaukee Building Company. This concern rved in the capacity of architects as well builders.

Of immediate interest to every builder nd architect is the fact that this costly ayhouse has been set back from the street 0 feet and therefore faces on a beautiful gyptian court of that depth and 75 feet width. Persons familiar with problems theater design will recognize in this arngement a very desirable provision for acommodating waiting crowds without blockg street and sidewalk traffic. With many eater managers the problem of how to spose of long lines that form in front of ox offices has long been a vexing one.

The courtyard arrangement has another arked advantage also. It makes it possible construct a theater whose width is very uch greater than the street frontage acuired. The theater itself does not rest on ts fronting on the business street (Hollyood Boulevard), from which it is entered ut covers land facing a side street, perpendicular to Hollywood Boulevard and much less expensive.

Looking from the colonnade toward the street showing the shops on one side of the courtyard

The courtyard is occupied with exclusive shops on one side and the other side terminates in a high wall of concrete fashioned to resemble masonry and embellished with reproductions of hieroglyphics. There is also a lily pool at the base of this wall which is fed by water flowing from the side of the wall and rippling down over blue tile in a thin silvery ribbon.

The colonnade forming the massive front of the theater is composed of Egyptian pillars more than six feet in diameter. Immediately back of the colonnade is the lobby 75 feet wide and 25 feet deep and with a 25-foot ceiling. The auditorium seats 1760, all on one incline floor, there being no gallery. It measures 116 feet wide and 118 feet long. The standard stage is 30 by 73½ with a height from its floor to the under side of the gridiron of 54 feet.

The projection room, which occupies the same relative position with respect to the main floor as would the central portion of a gallery, is unusual in that it has been finished and furnished with as much thought as the auditorium itself, the walls and ceilings being tinted, the latter a midnight blue, while the former are adorned with decorations, copying those found in the interior of the pyramids. Outside windows permit natural lighting of this room so that during matinees the operator does not work in ar-

Looking toward the corner of the building containing the ramp that leads to the foyer. Note the "Cleopatra's needle" in the background. It is the air intake for the heating and ventilating system

tificial light even though the audience sits in semi-darkness.

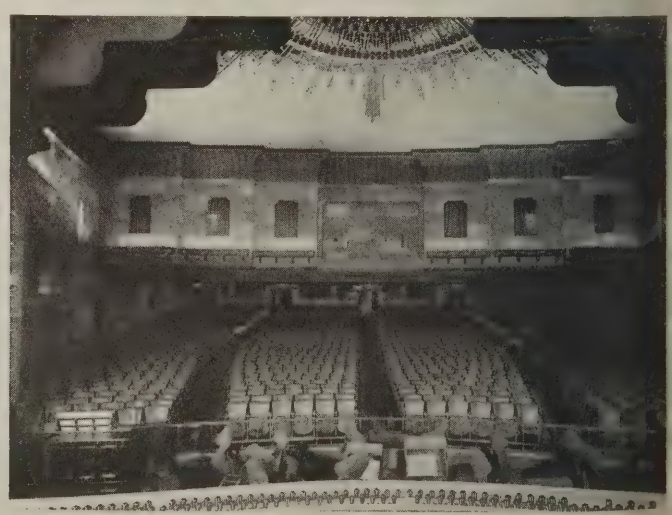
The theater is a Class A structure of reinforced concrete throughout and has tile filler walls. From an engineering standpoint it is especially interesting because of its two plane roof construction. The wall between the high and the low ceiling was especially adapted to the location of a structural member and the engineers have made use of this wall by building it in the main carrying member of the roof. The carrying member is a large arch, with a clear span of 114 feet, sustaining a load of 1,500,000 pounds and designed on the elastic theory as both a no-hinged and a two-hinged arch. This double precaution was taken to insure safety during the possible occurrence of an earthquake.

The main arch in turn supports 12 lesser arches, six in the high roof and six in the low, the former being carried by a reinforced concrete truss directly in front of and over the proscenium, which also supports a chamber 15 by 56 in which the Wurlitzer organ is installed. This location of the organ above the arch is regarded as peculiarly advantageous in that it permits the musical sounds to be deflected by the sloping roof through orifices in a huge sunburst immediately above the proscenium arch. This dominating decorative feature of the interior of the auditorium is in reality a grill through which sound easily passes.

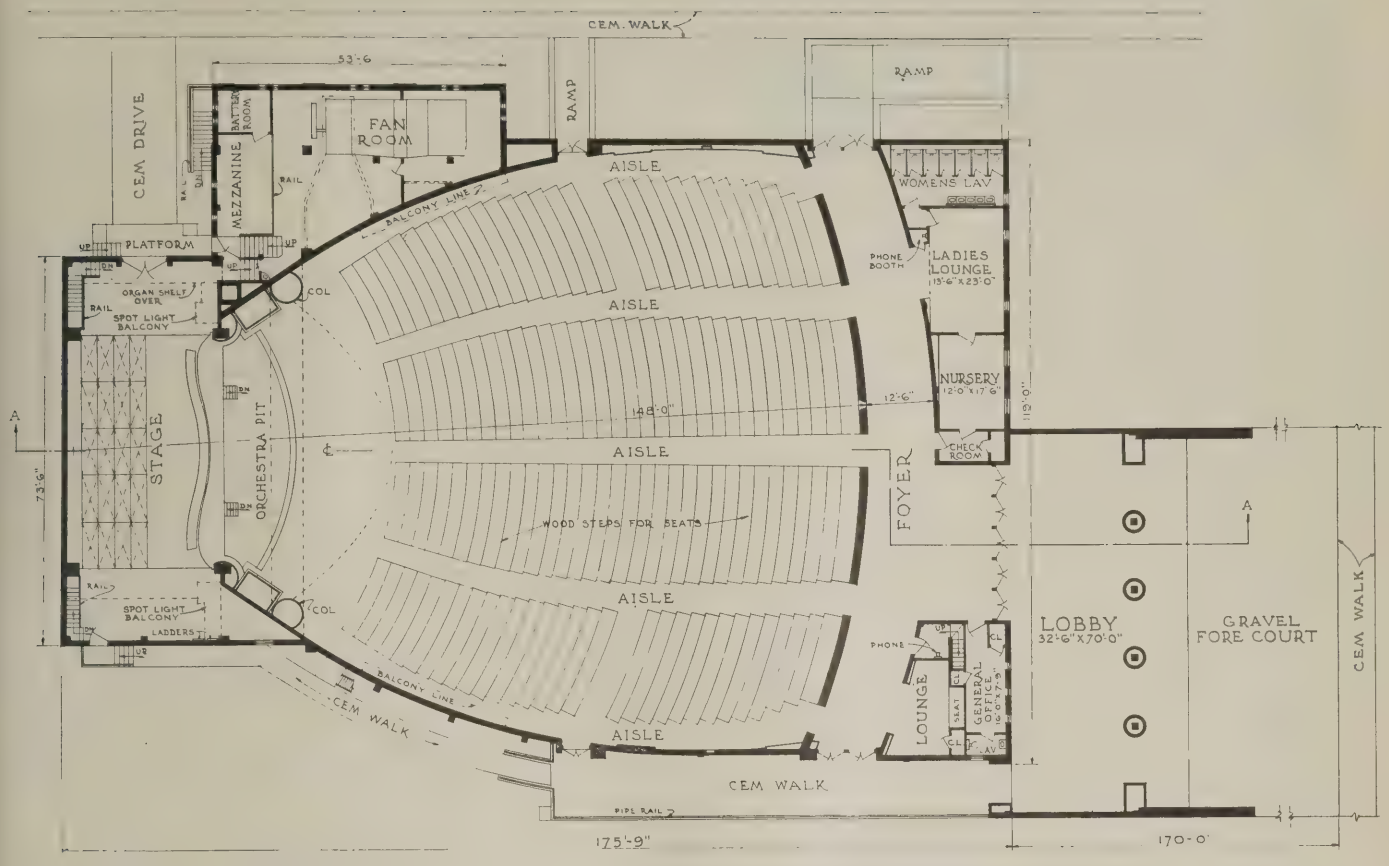
One of the side exits through which audiences can be dismissed to one of the side streets while another throng is admitted from the courtyard. This indicates the manner in which Egyptian ideas have been adapted to all details of this modern structure

The six trusses of the lower roof carry the projection room and a fireproof film vault. The roof itself is supported on the bottom cords of the arches and creates a flat box-like structure which would be very efficient in resisting any earthquake disturbances. The top cords of all arches are braced one to the other and to the building's walls by strut members, giving a very rigid frame, with the added advantage of being open to inspection at all times. The exposed sections of the arches have been

Looking toward the stage showing some of the lighting effects and the massive pillars and sphynx at either side of the stage and the manner in which the roof supporting structure has been incorporated into the ceiling and archway



Looking from the stage toward the projection room and fireproof film vault. For details concerning support of this portion see text. Note the huge sunburst in the ceiling through which issues sound from the pipe organ located in a long chamber over the arch



Floor plan of the new Egyptian motion picture theater in Hollywood, California, designed and built by Meyer and Holler, Los Angeles

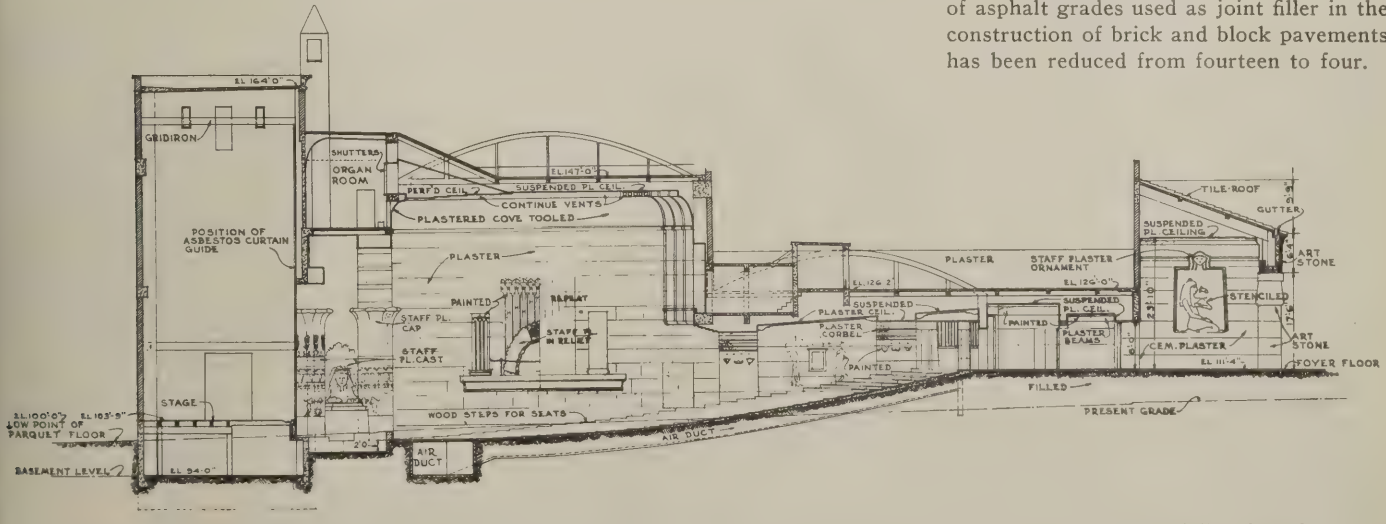
waterproofed and, being in a more or less perpendicular position, water or moisture cannot penetrate to the steel. The bottom cords of the arches, lying on the plane of the roof and covered only by waterproof paper, are exposed to practically the same temperature as the free standing top cords so that temperature stresses are very nearly eliminated.

The theater is ventilated and cooled and heated by a modern system of fans and air washers. The air is drawn in through an intake 60 feet above the street through a column patterned after Cleopatra's needle. After being cleaned the air is conducted through coils for heating or cooling.

The designing and construction were done by Meyer and Holler. D. R. Wilkinson was the chief architect; W. F. Gow, chief engineer; William Mellema, assistant chief engineer, and Edward Waugh, manager of construction. Prior to his death, Karl D. Schwendener, member of the American Society of Civil Engineers, was consulting engineer.

Asphalt Simplifications

AFTER January 1, 1924, "Too many asphalt grades" no longer will be the complaint of public highway officials, engineers, contractors and producers, the Department of Commerce having announced that the recommendations adopted at its recent asphalt paving conference will become effective and asphalt grades for use in the construction of sheet asphalt, asphaltic concrete, asphalt macadam and surface-treated pavements will be reduced from eighty-eight to nine. The number of asphalt grades used as joint filler in the construction of brick and block pavements has been reduced from fourteen to four.



Longitudinal section along line AA shown on floor plan. The wall between the high and the low ceiling was especially adapted to the location of a structural member and the engineers have made use of this wall by building it in the main carrying member of the roof

The Steel Square

II—How to Read It

EVERY carpenter is familiar with the steel square, but unless he knows his instrument intimately he is liable to be unaware of certain things he can do with it. It is surprising but nevertheless true that some men who have been using the steel square for years do not know what some of the tables stamped on it are for. This is unfortunate to say the least. It is like allowing opportunity to knock without opening the door. Every table on the square is a means of solving some problem and the man who does not know how to use these tables is overlooking a chance whereby many of his framing problems may be materially simplified.

This article is written for the man who is not as well acquainted with his square as he might be. Here, all the stampings found on an ordinary square will be dealt with in a comprehensive manner and thoroughly explained so that the use of the tables will be made clear. Your suggestions, criticisms and questions are invited.

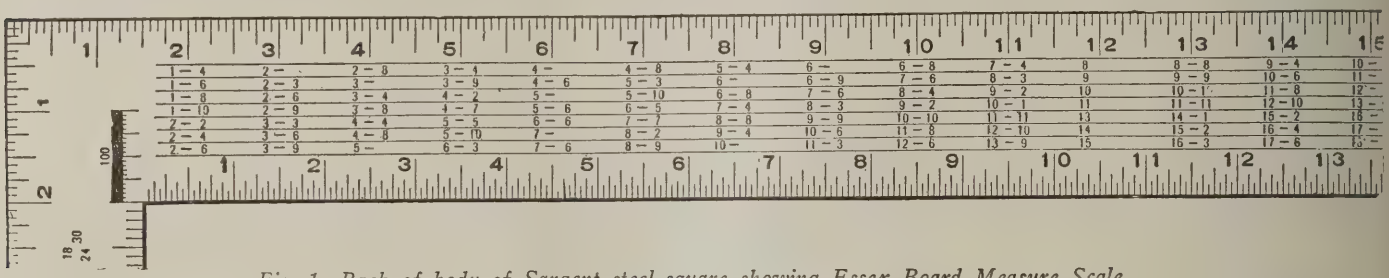


Fig. 1—Back of body of Sargent steel square showing Essex Board Measure Scale

It may be said that all steel squares, no matter what make, carry practically the same framing tables. Some may be a little more complete than others, the tables may be arranged in a different manner, the method of reading may be somewhat different, but since all similar tables are based on the same calculations, a knowledge of one make of square will enable a carpenter to use, almost without exception, any other make on the market. For example, Fig. 1 shows the Essex Board Measure table on a Sargent square and Fig. 2 shows the same table as marked on a Stanley square. At a glance, it would appear that these two tables are for different purposes, for the markings are somewhat different, but upon closer inspection it will be seen that the vertical column of figures under 6 on the outer edge of the square in Fig. 1 is the same as the corresponding column of figures on the square in Fig. 2. The difference lies only in the way the figures are stamped.

As another example notice Figs. 3 and 4. Fig. 3 shows the end of the face of the body of a Peck, Stow and Wilcox square and Fig. 4 shows the same portion of a Nicholls Manufacturing Company square. It will be noticed that the lettering of the tables is somewhat different, though the markings are essentially the same. This is true for all markings on all squares—although the respective tables may be differently arranged, the calculations from which the figures are derived are the same in each case.

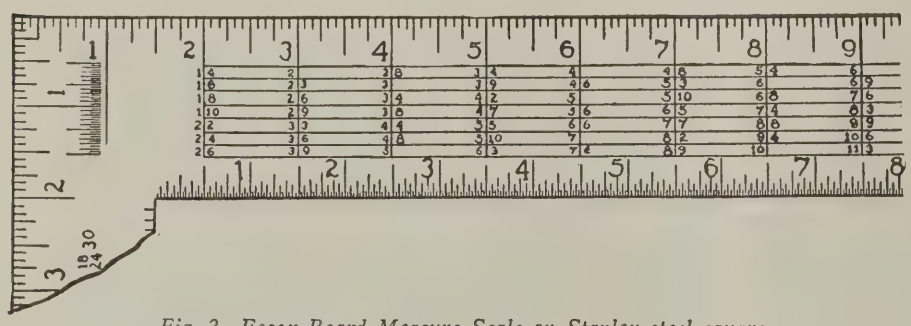


Fig. 2—Essex Board Measure Scale on Stanley steel square

The average steel square may be stamped with any of the following markings:

1. Hundredth scale.
2. Octagon or "eight-square" scale.
3. Essex board measure.
4. Brace measure.
5. Angle cuts for polygons.
6. Rafter tables.

It may carry all of these markings, it may be stamped with only a few, or it may be marked with a table that is not mentioned here, but the six tables noted are those most commonly encountered.

The inch graduations may be $^1/_{32}$, $^1/_{16}$, $^1/_{12}$, $^1/_{10}$, $^1/_8$ or $^1/_4$, and some squares are marked in centimeters for metric measure. As a general rule it will be found that the inch graduations on the ordinary steel square are as follows:

Outside edge of *face* of body.....16ths
Outside edge of *face* of tongue.....16ths
Inside edge of *face* of body..... 8ths
Inside edge of *face* of tongue..... 8ths
Outside edge of *back* of body.....12ths
Outside edge of *back* of tongue.....12ths
Inside edge of *back* of body.....32nds
Inside edge of *back* of tongue.....10ths

This tabulation is not true for all squares but few variations from it will ever be found.

It will be noticed that in the above tabulation the outside edges of the face of both the body and tongue are marked with the same graduations. This is true also of the outside edges on the back of the square. It is necessary that this be so as will be evident from the explanation of the use made of the square in framing which will be explained in the next of this series of articles.

The hundredth scale is generally a one-inch portion of the square divided into hundredths of an inch. This scale may be of two types, the direct-reading, as shown in Fig. 5, or the proportional scale, as shown in Fig. 6. In Fig. 5 the hundredth scale is so laid out that it is combined with the $^1/_{10}$ graduation on the inner edge of the tongue in order that so many hundredths with so many inches may be laid off at once with a pair of dividers.

The proportional scale is a bit more difficult to read and is shown in detail in Fig. 7. It is one inch wide and is divided vertically and horizontally into ten parts. The lines connecting the division points on the edges AD and BC are drawn horizontally, but

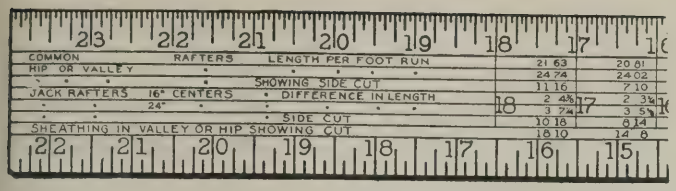

COMMON RAFTERS LENGTH PER FOOT RUN
HIP OR VALLEY
SHOWING SIDE CUT
JACK RAFTERS 16" CENTERS DIFFERENCE IN LENGTH
24"
SIDE CUT
SHEATHING IN VALLEY OR HIP SHOWING CUT

Fig. 3—End of face of body of Peck, Stow and Wilcox steel square

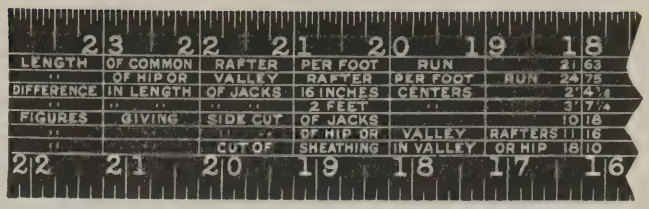

LENGTH OF COMMON RAFTER PER FOOT RUN
OF HIP OR VALLEY RAFTER PER FOOT RUN
DIFFERENCE IN LENGTH OF JACKS 16 INCHES CENTERS
2 FEET
FIGURES GIVING SIDE CUT OF JACKS
OF HIP OR VALLEY
CUT OF SHEATHING IN VALLEY OR HIP

Fig. 4—End of face of body of Nicholls Manufacturing Company steel square

the lines connecting the division points on the edges AB and DC are drawn from one division on DC to the next division on AB, thus giving them a slant of one division or one-tenth inch. Suppose it were required to find seventeen hundredths inches (0.17) on

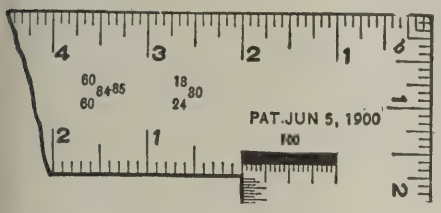


Fig. 5—Direct reading hundredths scale

the scale. The space 1 on line DC is equal to one-tenth (0.1) inch and to find the additional seven hundredths required follow up the slanting line between space 1 and space 2 for seven spaces and at W, the seventh line above DC, will be found the reading seventeen hundredths (0.17). In a like manner the reading at X is thirty-three hundredths

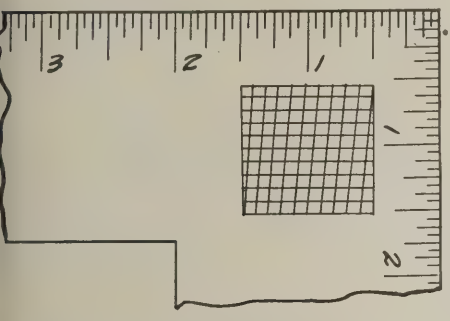


Fig. 6—Proportional hundredths scale

(0.33), at Y it is sixty-eight hundreds (0.68) and at Z, ninety-five hundredths (0.95).

Almost every square has the octagon or "eight-square" scale. This scale is generally found in the center of the face of the tongue and is shown in Fig. 9. The purpose of this scale is laying out the lines to cut an octagon, or "eight square" stick from a stick having a square section. In Fig. 8, suppose the square AEIM is the butt of a square stick of timber six inches on a side. Draw the lines CK and GO through the center of the stick, parallel to the sides and at right angles to each other. With the dividers take as many spaces from the scale as there

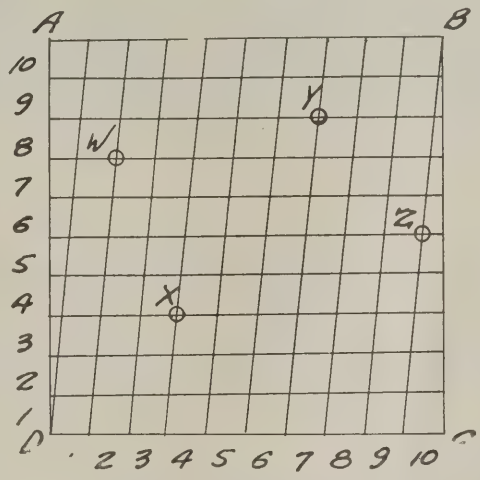


Fig. 7—Explanatory sketch of proportional hundredths scale

are inches in the width of the stick (in this case, six) and lay off this space on either side of the points C, G, K and O, and marking the distances BC, CD, FG, GH, JK, KL, NO and OP. Then draw the lines DF, HJ, LN and PB, and the figure BDFHJLNPB will be, for all practical purposes, an octagon. It will not be mathematically correct, but the error will be so small as to make no difference for cutting the stick.

The Essex Board Measure scale, shown in Fig. 1, is read as follows: The figure 12 in the graduation marks on the outer edge represents a one-inch board 12 inches wide and is the starting point for all calculations; down the table. Therefore, to get the square feet of a board eight feet long and six inches wide find the figure 8 in the scale under the 12-inch graduation mark and pass the pencil along to the left on the same line to a point below the graduation mark 6 (representing

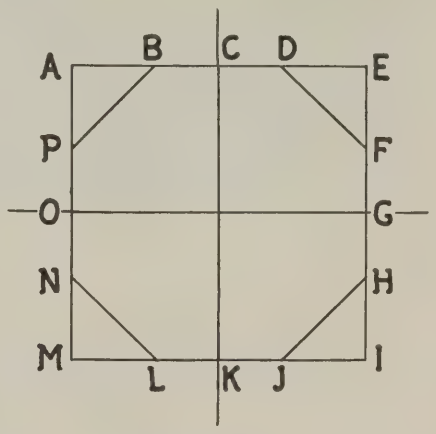


Fig. 8—Explanatory sketch for Octagon or "Eight-Square" scale

the width of the board), stopping on the scale at 4, which is four feet, the board measure required. If the board is the same length and 10 inches wide, find the figure 8, which is the length of the piece, under the graduation 12 on the outer edge and pass to the left on the same line in which the 8 is located until you arrive at the graduation 10 on the outer edge. Here are found the figures 6-8, which indicate that the piece contains 6 8/12 feet board measure. If the piece is 13 feet long and 7 inches wide, find 13 in the vertical scale under the 12-inch graduation and pass to the left, on the same line, to the seven-inch graduation. Here is found 7-7, which shows the piece to contain 7 7/12 feet board measure. If the board is half this length, take half the result; if double this length, double the result. For stock two inches thick, double the figures; for three-inch stock, triple the figures. Thus

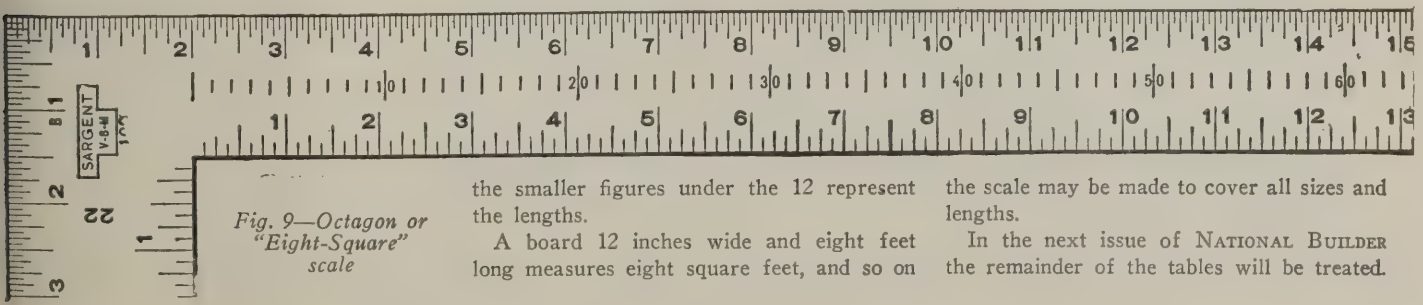


Fig. 9—Octagon or "Eight-Square" scale

the smaller figures under the 12 represent the lengths.

A board 12 inches wide and eight feet long measures eight square feet, and so on the scale may be made to cover all sizes and lengths.

In the next issue of National Builder the remainder of the tables will be treated.

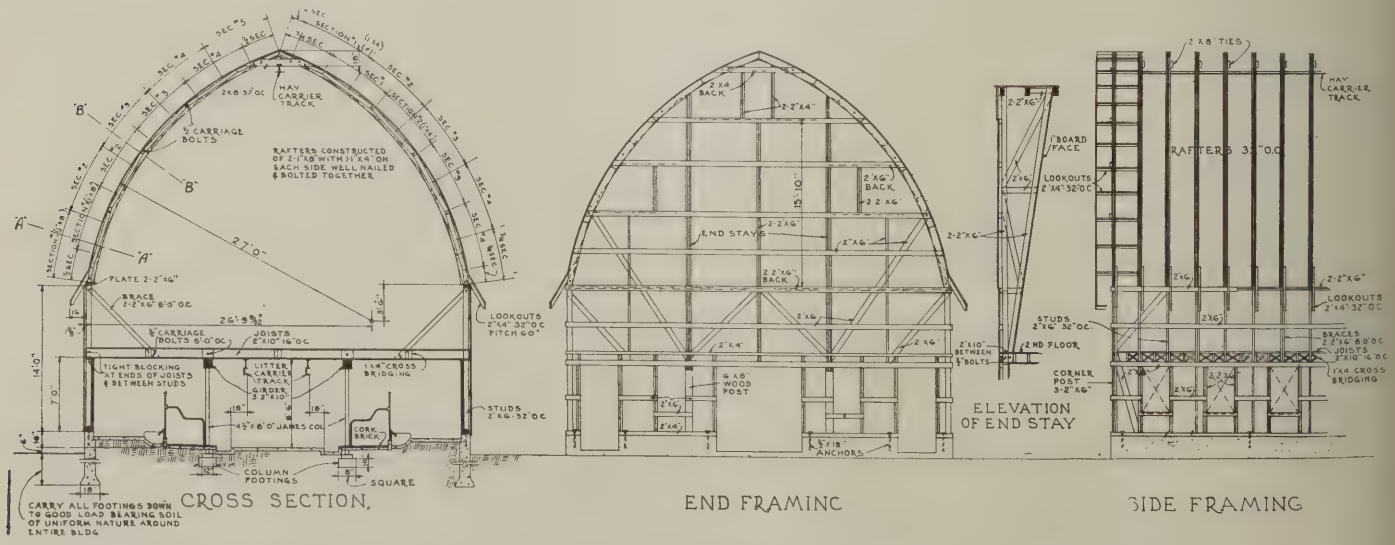
A good example of a moderate size, Gothic-roof dairy barn

Modern Practice in Gothic Roof Barn Framing

A Discussion of Two Different Types of Rafter Framing for the Arched Roof Barn

THERE are three popular types of barn-roof framing: The ordinary gable roof, the gambrel roof, and the Gothic roof. The gable roof for barns is rapidly losing favor and will soon be a thing of the past since it does not provide as much loft space as the other two types mentioned.

It has been the writer's observation that there are more gambrel barn roofs than any other type being constructed today through the great farming regions of the Northwest and the Middle West. It is also this writer's opinion that even as the gambrel roof has replaced the gable roof, just so will the Gothic roof replace the



Framing details for Gothic-roof barn where all rafters used are identical. The schedule for locating the pieces which make up the rafter is shown around the arch in the cross-section

l Gothic-roof barn under construction. These rafters are of the type formerly used

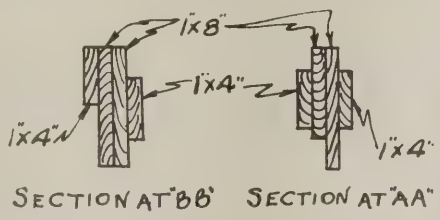
ıbrel. For one thing, the Gothic type f, examples of which are shown here, ws for more loft space than any other l of roof which can be built at the ıe cost. This means utility, and on the n, utility is one of the prime requisites any structure or piece of equipment. de from its purely utilitarian stand- ıt, a Gothic-roofed barn, with its nded and shapely appearance adds dig- and beauty to a location where these qualities are generally hard to pro- e.

armers have, for some reason or other, ıtated to build Gothic roofs because thought these roofs expensive and cult to erect but, while this type of may be said to be somewhat higher ost than the gambrel roof, it provides siderably more unobstructed loft space, the whole proposition resolves itself "does the value of the additional loft ce warrant the extra initial cost of struction?" And this is for the farmer ıe to decide.

here has been considerable improve- ıt in Gothic roof design and two ex- ples are given here for two different es of construction. The former method, ch is now being displaced, utilized two erent kinds of rafters. Main rafters, sisting of four 1x10 were spaced 8 feet centers and between these main raft- were intermediate rafters built up of 1x4, spaced between the main raft- 32 inches on centers. The main raft- were calculated to maintain the shape he roof since the intermediate rafters, ıuse of their construction, could be nded upon to carry the load but would liable to deviate somewhat from the red curve.

new rafter design for Gothic roofs ch not only retains the arch shape and ports the load but also requires less ber than the old type has been de- ped by the James Manufacturing Com- , who, after having subjected this gn to practical tests, are recommend- ing it to all farmers who contemplate building a Gothic roof barn. This new design utilizes only one kind of rafter throughout, spaced 32 inches on centers.

To give a true comparison, three rafters only should be considered for each 8 feet 0 inches of length. With the old design this



Sections through built-up rafter

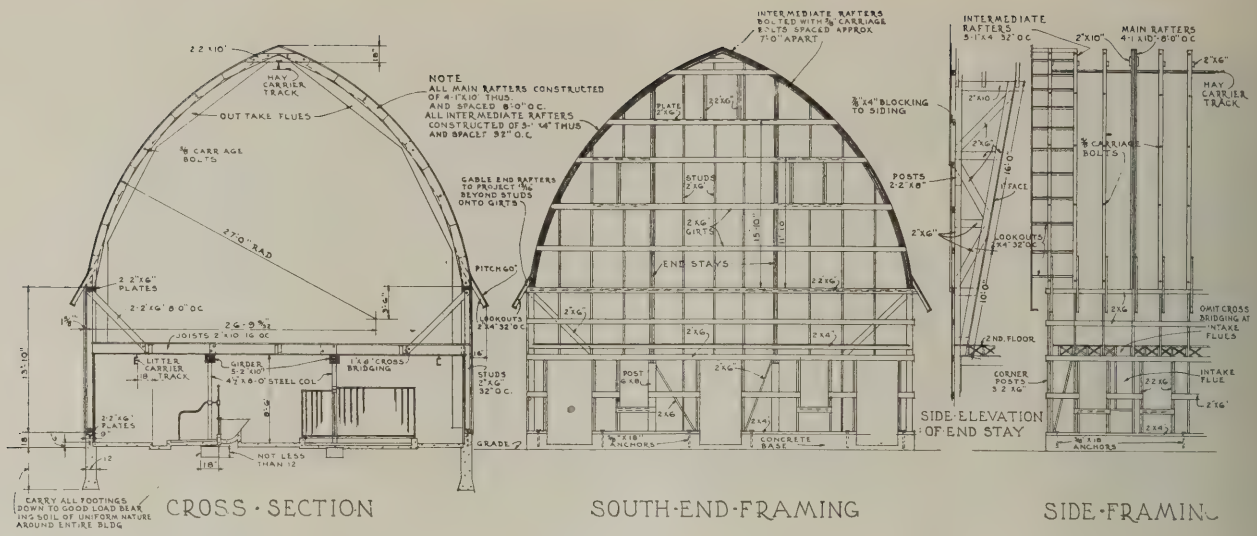
gives one main rafter of 4 pieces 1x10-inch and two intermediate rafters each containing 5 pieces 1x4-inch, a total of 80 square inches of rafter cross section. In the new design, an 8-foot section of roof requires three rafters each constructed of two 1x8 and two 1x4, a total of 72 square inches of rafter section—a saving of 8 square inches, or 10 per cent.

For an 8-foot section of the old type Gothic roof it was necessary to saw to a curve the four 1x10 which made up the main rafters. For an 8-foot section of the new type Gothic roof it is necessary to curve-cut more lumber than that required for the old type since six 1x8-inch are required for the four rafters which support the 8-foot section. When done on a power saw this is not a large item. Since the cost of framing the 1x4 should be about the same for both cases, this new type roof effects a saving equal to the cost of 10 per cent of the lumber used in building rafters of the old type, a saving which amounts to considerable if the barn is of even moderate size.

In building these rafters it is necessary that the ends of the pieces which go to make up the finished rafter be butted tightly against each other and that the whole be well nailed and bolted as shown in the sketch. If the rafter pieces are not tightly butted together at the ends there is a possibility that the rafter will be distorted under load. The exercise of a little care, however, in building them will prevent this. All rafter lumber may be cut in a mill or on a band saw, if the farm is so equipped, and assembled at the barn site. It is necessary that the radius of the arch be determined beforehand, and also the bevels for the ends of the 1x4.

All joints are "broken" so that the rafter may be as strong as possible. The diagram for the location of the joints is shown on the outside of the roof arch in the accompanying illustration.

A method of erecting rafters for a Gothic-roof barn without the use of a gin-pole. Note that the rafter being lifted into place is prevented from slipping by butting the ends against the rafter already in position



Framing details for Gothic-roof barn where two different types of rafters are used

A practical method for erecting a Gothic roof is to build the barn up to the level of the rafter plates and lay the loft floor. The floor can then be used as a place where the rafter can be framed. Framing rafters on the loft floor means that it will not be necessary to hoist them from the ground, but only to turn them into their proper position on the plates by means of a gin pole or according to the method shown in an accompanying illustration.

Before being lifted into their final position, all rafters should be framed completely and the collar-beam, the piece which holds the two sides of the arch together at the top, set in place. When hoisting into place, the base of the rafte may be butted against the base of th preceding rafter, and the rafter space after it stands erect. A good connectio at the plate is necessary so that the roo will form a unit with the walls. The plat connections for arched rafters are simila to those for ordinary truss rafters.

Painting Concrete Surfaces

MUCH objection has been raised to the unsightliness of the exposed columns and beams of the ordinary reinforced concrete building. These members are generally lined with form marks and are sometimes of different colors in the various sections due to their not having been poured at the same time. Attempts have been made to overcome this unsightly appearance by plastering and painting, but the results are often far from satisfactory. With the aim to present a method for successfully treating concrete surfaces with a cement wash, the Committee on Treatment of Concrete Surfaces of the American Concrete Institute presented at their annual meeting in Cincinanti the following, "Recommended Practice for Treatment of Exterior Surfaces of Industrial Reinforced Concrete Buildings." There is no reason why this method of treatment should not hold good for any exposed surface not subject to frictional wear.

Cement washes of practically any color from white or cream to cement gray can be prepared by varying the proportions used of white or gray cement and light or dark sand. A mixture of one part of white cement and one part of finely screened yellow bank sand, with 5 per cent of hydrated lime (by volume of cement), will give a serviceable color just off the white, and will serve as an example of a typical dry mixture.

After the cement, sand and lime in the desired proportions have been mixed in the dry state the mixture should be added slowly to water, stirring vigorously until the consistency is that of a stiff oil paint. The dry batch should be large enough for a full day's work, but only enough of the wash should be prepared to last one hour. The wash should be fully stirred in the container before each application to the concrete surface, and when refilling the container all the old wash should be cleaned out.

Before applying the wash all pointing and patching should be done. The area to be coated should first be thoroughly wet and then a full brush coat of the wash applied. This coat should be rubbed in with a cork float, the surface being sprinkled with a little additional water if necessary. Finally the surface should be gone over with a clean damp brush, brushing in the direction of the board marks. In this process all excess material should be removed, and the remaining coat should be as thin as will permit the surface to be entirely covered.

In coating adjacent areas the brush marks should be carefully blended to avoid a line between the two areas. The joinings should occur at natural breaks in the surface.

In warm weather or in drying weather the finished surface should be sprinkled with water once a day for three days, and in cool damp weather should be sprinkled at least once within 24 hours after finishing.

The sand must be dry before screening not only to facilitate the screening but also to avoid the possibility of moisture in th sand causing a set in the dry mix. Bes results seem to be obtained with a No. 1 sieve.

A very fine appearance is obtained if th wash is rubbed in with a carborundum stone This not only insures a better bond, by mor positively forcing the materials into th pores of the concrete, but at the same tim grinds down any slight projection.

Sprinkling of the freshly coated surfac is necessary, for if the wash dries before i has attained its set, it will dust off. A ver practical way to sprinkle the surface is t make up two perforated pieces of pipe abou 4 ft. long on a "T" and plug the ends. Ther connect a hose to the leg of the "T" an lower the pipe down from the roof over th face of the columns and walls. Spray noz zles can also be used to advantage. Th sprinkling must be gentle.

The committee has been informed that very effective way of insuring the bond o the wash coat is to use a 4 per cent solutio of commercial calcium chloride as the guag ing liquid instead of plain water. This solu tion is made up by dissolving one pound o the chloride in three gallons of water. Th calcium chloride attracts moisture from th air and keeps the wash coat damp for sev eral days, thus insuring that the cement set before it dries out.

The cement wash will require about on bag of cement per 1000 sq. ft. of wall area

A Group of Three Houses

Drawn Especially for NATIONAL BUILDER by the Regional Bureaus of The Architects Small House Service Bureau of The United States Inc. with Complete Quantity Surveys

U.S.A. ARCHITECTS SMALL HOUSE SERVICE BUREAU INC.

TRADE MARK

"I ACKNOWLEDGE with thanks the receipt of plans, specifications and quantity survey for House No. 6A49, forwarded to me at your request by The Architects' Small House Service Bureau.

"I desire to compliment you, and through you, the Architects' Small House Service Bureau, on the completeness of these documents."

The above is an expression of appreciation from an architect of the service that NATIONAL BUILDER, with the co-operation of the Architects' Small House Service Bureau, is rendering him. It also expresses the approval which a great many other architects of standing have given to this architectural service. These men realize that the publishing of complete plans by NATIONAL BUILDER is a distinct step forward in the promotion of better architectural standards, and is an encouragement to builders generally to construct houses of better design.

This architect's testimonial is typical of what everyone who has used them thinks of these plans by The Architects' Small House Service Bureau. The plans are unusually complete: they contain not only floor layouts, but construction details, elevations, in many cases alternate suggestions, and in addition, complete quantity surveys or material lists. It is not often that plans for small houses are so thoroughly worked out. The builder who constructs a house or two from this service can appreciate its real value to him. These plans will save him much time and trouble, and will avoid many costly mistakes which are bound to occur when a house is constructed without having been carefully worked out on paper beforehand.

NATIONAL BUILDER recommends to builders contemplating building any of these houses that they purchase blue prints of the complete working drawings from the Architects' Small House Service Bureau. Through a special arrangement with the Bureau, subscribers to this magazine are permitted to buy such blue prints for these houses at half the regular price. (The price is quoted in the description of each house.) Duplicate sets of blue prints can be purchased at $3.00 each; specifications are $2.50 a set and extra quantity surveys are $3.00 a set. Orders should be addressed to NATIONAL BUILDER for authenticating the purchaser as a bona fide subscriber, but checks should be made out to the Bureau.

Below is an explanation of the material and wiring symbols and miscellaneous data pertaining to plans on the following pages

MATERIALS		ELECTRIC WIRING SYMBOLS			
CONCRETE		CEILING OUTLET		3 WAY SWITCH	
BRICK		DROP CORD		GAS OUTLET	
WOOD		BRACKET		PUSH BUTTON	
PLASTER		BASE PLUG		BELL OUTLET	
TILE		SWITCH		BUZZER	

Dimensions are taken to outside of foundation walls, to outside of studs on exterior walls and center of studs for partitions.

Foundation walls shown concrete may be stone, brick, concrete block, or load-bearing hollow tile.

Where building ordinances permit, foundation walls may be 9 in. thick (with 20x9-in. footings), except in case of stone, which shall be 18 in. thick.

Stock numbers refer to moldings in Universal Millwork Design Book No. 20. In case these moldings cannot be procured, others of similar design and size may be substituted.

Provide 1⅛-in. screen and storm sash for all exterior openings, except ice door, unless otherwise noted. Bottom rail of storm sash to have vent.

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A Gambrel Roof Treatment of a House with Six Major Rooms

House No. 6A60, designed especially for National Builder by The Architects' Small House Service Bureau

WASTE space is entirely eliminated in the home shown here, yet it includes such desirable conveniences as a coat closet, broom closet on both floors, dining alcove and linen closet.

Construction is frame. In the picture it has large shingles for exterior finish, but siding or stucco can be used if preferred by the builder. The brick base course is laid in checker pattern; the cement porch is attractively bordered with brick; brick steps lead to the front stoop and the gable ends are finished with shingles.

The style is true Dutch Colonial, and the house is beautifully designed and proportioned both as to plans and exterior. As shown it will go on a fifty foot lot but with the porch omitted or placed at the rear it can be built on a somewhat narrower frontage.

This six room house has the same plan arrangement as 6A47 illustrated in the February issue of the NATIONAL BUILDER, and 6A54, illustrated in the June issue.

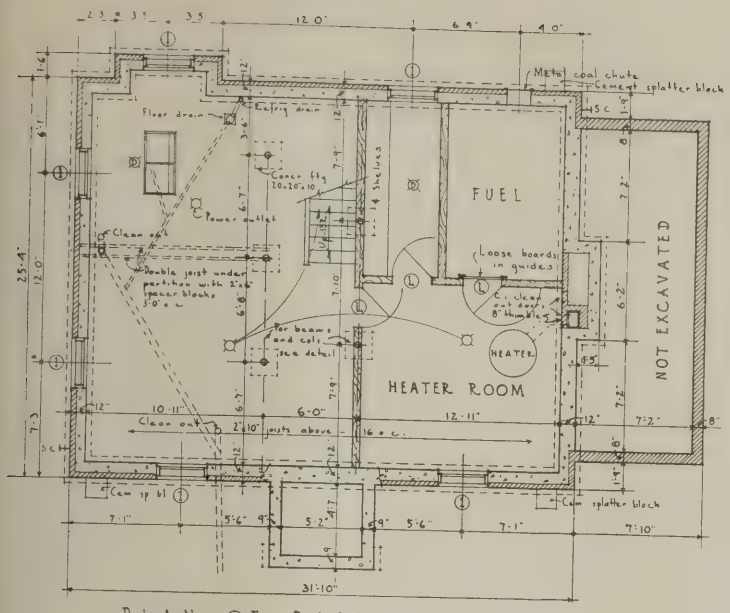
A charming effect, and vistas from room to room, should be produced by the large arched cased openings between stair hall and dining room and living room. Double French doors lead from the living room to the side porch, so that this will be practically an outdoor living room.

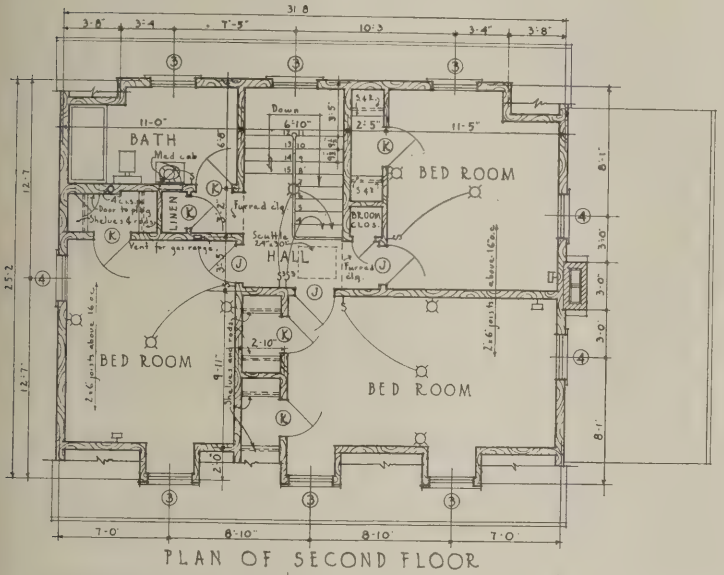
Among the modern conveniences not overlooked is a breakfast alcove in the kitchen. The ice box has an outside icing door, another modern comfort. Women appreciate it. And in showing this plan to a woman we point out the little broom closet on the second floor—a handy place for the vacuum cleaner.

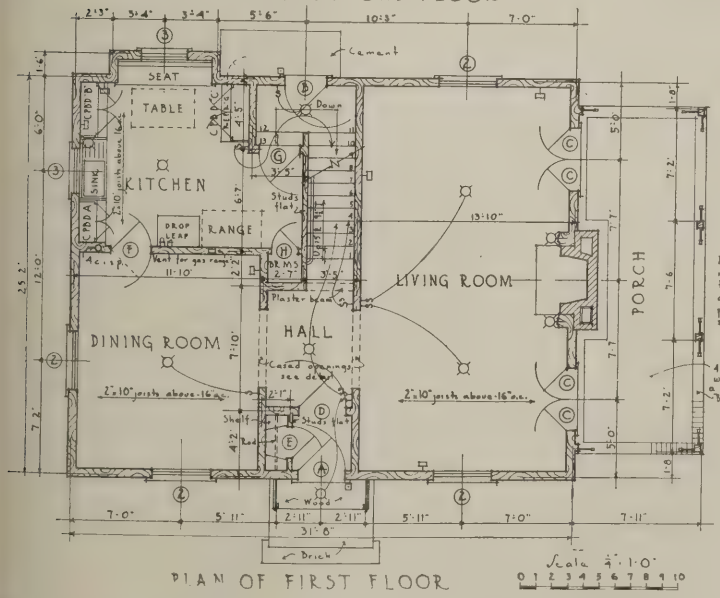
Three excellent bedrooms and bath complete the second floor. There are large closets in every bedroom and two closets in the main bedroom.

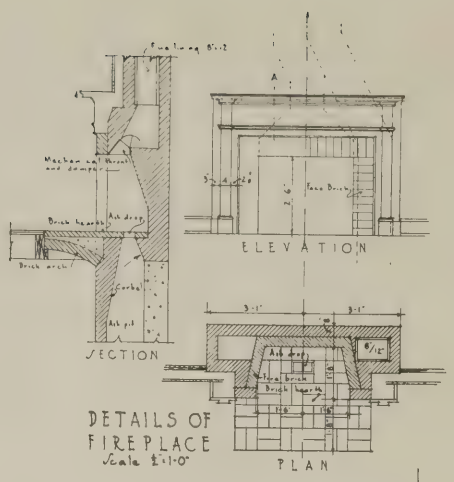
As designed this house should face west or north and should be reversed for other facings.

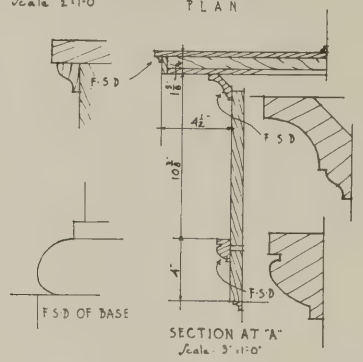
The price of this plan is $30.50 (to NATIONAL BUILDER subscribers $15.50.)

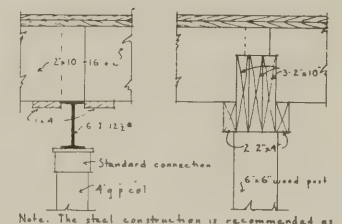


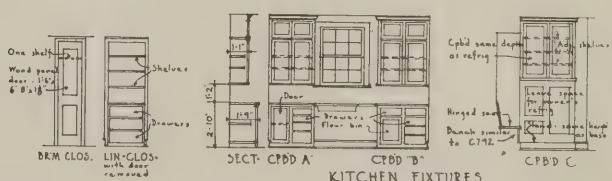









Standard connection
4" g.p. col
6"x6" wood post
Note. The steel construction is recommended as it eliminates shrinkage. If it is not obtainable the wood construction may be used.
DETAIL OF BEAM AND COLUMN


BR'M CLOS.
LIN. CLOS. with door removed
SECT. CPBD A
CPBD "B"
CPBD C
KITCHEN FIXTURES
Mill contractor should get measurements for fixtures at the building. Doors are 1⅜" thick and shall have glass or wood panels as directed by owner.
Scale 1/2" : 1-0"

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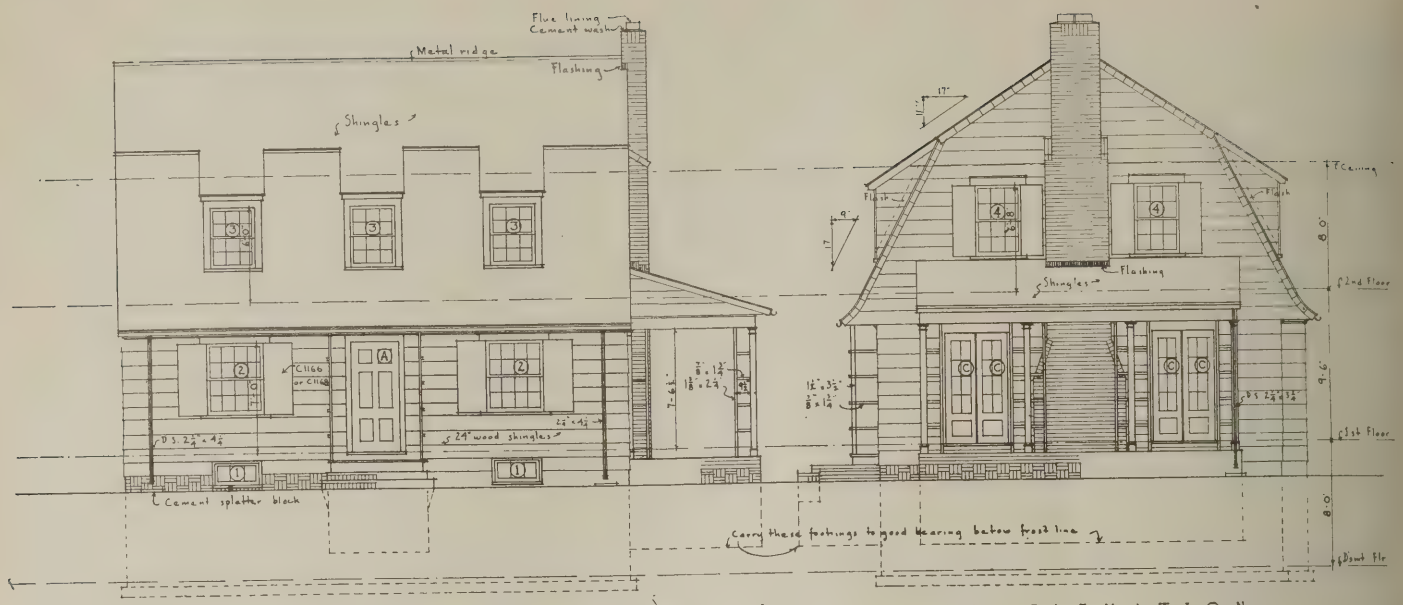
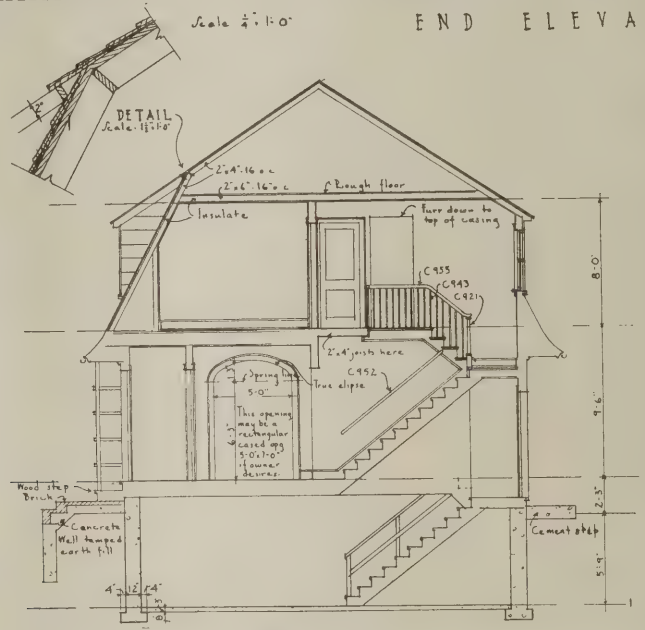
Plans and details for House No. 6A60, designed especially for National Builder by The Architects' Small House Service Bureau



FRONT ELEVATION

END ELEVATION

Note. This house may be built with a single dormer in front if desired. If this is done, make the dormer the same width as the one on the back of the house, keep the windows located as shown on the front and equip them with shutters. The three small dormers as shown are recommended as being superior in appearance.



END ELEVATION

Scale ¼"=1'0"

REAR ELEVATION

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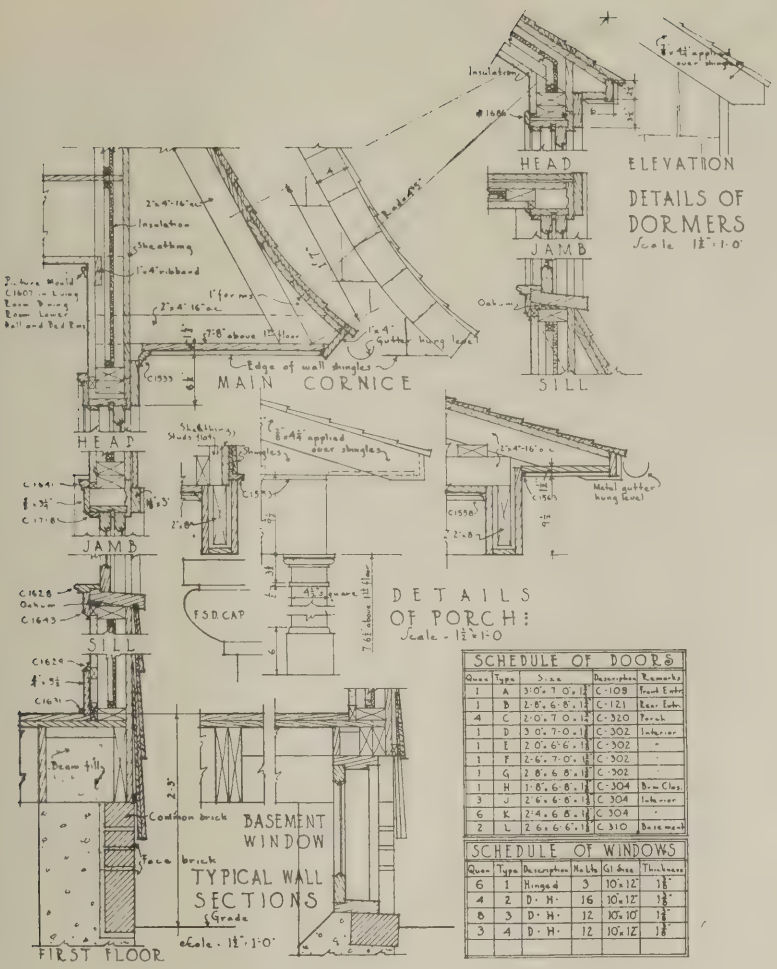
Plans and details for House No. 6A60, designed especially for National Builder by The Architects' Small House Service Bureau



SCHEDULE OF DOORS

Quan.	Type	Size	Description	Remarks
1	A	3'0"x7'0"x1¾"	C-109	Front Entr.
1	B	2'8"x6'8"x1⅜"	C-121	Rear Entr.
4	C	2'0"x7'0"x1⅜"	C-320	Porch
1	D	3'0"x7'0"x1⅜"	C-302	Interior
1	E	2'0"x6'6"x1⅜"	C-302	"
1	F	2'6"x7'0"x1⅜"	C-302	"
1	G	2'8"x6'8"x1⅜"	C-302	"
1	H	1'8"x6'8"x1⅜"	C-304	Bath Closet
3	J	2'6"x6'6"x1⅜"	C-304	Interior
6	K	2'4"x6'8"x1⅜"	C-304	"
2	L	2'6"x6'6"x1⅜"	C-310	Basement

SCHEDULE OF WINDOWS

Quan.	Type	Description	No. Lts	Glass	Thickness
6	1	Hinged	3	10"x12"	1⅜"
4	2	D. H.	16	10"x12"	1⅜"
8	3	D. H.	12	10"x10"	1⅜"
3	4	D. H.	12	10"x12"	1⅜"

EXCAVATING—195 cu. yd.
BACKFILLING—42 cu. yd.
FOUNDATION—If 12" concrete, 48 cu. yd. gravel, 198 sax cement; if 9" concrete, 39 cu. yd. gravel, 148 sax cement; if 12" tile, 23000 CBM tile, 18 cu. yd. mortar; if 9" tile, 17500 CBM tile, 14 cu. yd. mortar; 1200 face brick; 70 lb. mortar color.
CEMENT FLOORS—5 cu. yd. sand; 6 cu. yd. gravel; 67 sax cement; 3 cement spatter blocks.
CHIMNEY—2400 common brick; 1200 face brick; 100 fire brick; 14 sq. ft. hearth tile; 180 inside face brick; 64 lin. ft. 8x12 flue tile; 20 lb. fire clay; 3 cu. yd. mortar; 1 cast-iron ash dump; 1 throat and damper; 1 angle 4x3x5/16-4'0; 2—8x10 cleanout doors; 1—8" thimble; 2—6" thimbles; 8 yd. metal lath; 200 lb. mortar color.
LATH—9 yd. metal lath over furnace; 10750 wood lath.
PLASTER—9 yd. plaster on metal lath; 760 yd. plaster on wood lath; 16 yd. Keene's cement.
TILE—34 sq. ft. ceramic tile; 32 lin. ft. cove base.
LUMBER—5—6x6-7 posts; 144 lin. ft. 2x10 girders; 96 lin. ft. 2x4 girder ribbon; 4 ft. of plank cleanout cover; 144 lin. ft. 2x4 basement partition plates; 20—2x4-7 basement partition studs; 240 ft. D & M basement partition sheathing; 3—2x10-14 basement stair horses; 50 lin. ft. 2x10 box sill; **First Floor Joist:** 20—2x10-14, 20—2x10-18; 900 ft. com. bds. first floor subfloor; 1180 ft. 13/16x1½ first floor finish flooring; 340 lin. ft. 1x3 bridging; 3—2x4-16 shelf supports; 4—1x12-12 shelves in basement; 3—2x10-16 first floor joist headers; 2—2x10-14 opening doubles; 258 lin. ft. 2x4 first floor partition plates; 76—2x4-9 first floor partition studs; 3—2x10-16 first floor stair horses; 4—2x12-6 opening headers; **Porch Girder:** 2—2x8-22; 4—2x8-8; 18—2x4-8 porch ceiling joist; 220 ft. ceiling for porch; 18—2x4-10 porch rafters; 3—2x4-16 porch studs; **Second Floor Joist:** 20—2x10-14; 20—2x10-18; 4—2x10-16 headers; 52 lin. ft. 1x3 ribbon; 1100 lin. ft. grounds; 900 ft. com. bds. second floor subfloor; 1100 ft. 13/16x1½ second floor finish floor; 348 lin. ft. 2x4 second floor partition plates; 95—2x4-8 second floor partition studs; 25—2x6-20 second floor ceiling joist; 334 lin. ft. 2x4 outside wall plates; **Outside Wall Studs:** 100—2x4-10; 50—2x4-12; 25—2x4-16 dormer studs and plates; 800 ft. D & M attic floor; **Rafters:** 25—2x4-14; 25—2x4-12; 6—2x4-10; 8—2x4-14; 10—2x4-10; 8—2x4-11; 10—2x4-16; 2—2x8-26 dormer headers; 34 lin. ft. 1x6 ridge rafter; 2000 ft. com. bds. roof sheathing; 14 M shingles; 2200 ft. shiplap wall sheathing; 8 M shingles; 20—2x4-16 lookouts; **Scaffold and Extras:** 30—2x4-16; 6—2x8-14; 3—2x10-16.
MILLWORK—Frames: 6—10x12-3L-1⅜; 4—10x12-16L-1⅜; 8—10x10-12L-1⅜; 3—10x12-12L-1⅜. **Windows:** 6 sash 10x12-3L-1⅜; 4 wds. 10x12-16L-1⅜; 8 wds. 10x10-12L-1⅜; 3 wds. 10x12-12L-1⅜. **Storm Sash:** 6—10x12-3L-1⅛; 4—10x12-16L-1⅛; 8—10x10-12L-1⅛; 3—10x12-12L-1⅛. **Screens:** 6—10x12-3L-1⅛; 4—10x12-16L-1⅛; 8—10x10-12L-1⅛; 3—10x12-12L-1⅛. **Shutters:** 4 pr. wds. 10x12-16L-1⅛; 2 pr. wds. 10x10-12L-1⅛; 3 pr. wds. 10x12-12L-1⅛. **Outside Door Frames:** 1—3'0x7'0-1¾; 1—2'8x6'8-1¾; 2 double opng. 4'0x7'0-1¾; 1 icing door frame. **Outside Doors:** 1—3'0x7'0-1¾ (C109)*; 1—2'8x6'8-1¾ (C121); 4—2'0x7'0-1¾ (C320); 1 icing door. **Storm Doors:** 1—3'0x7'0-1⅛; 1—2'8x6'8-1⅛; 2 pr. 2'0x7'0-1⅛. **Screen Doors:** 1—3'0x7'0-1⅛; 1—2'8x6'8-1⅛; 2 pr. 2'0x7'0-1⅛. **Outside Millwork:** 280 lin. ft. cornice; 8 lattice frames 1'0x8'3; 4 porch posts; 2 astragals for 7'0 doors-1¾; 36 lin. ft. porch facia; 36 lin. ft. porch soffit; 36 lin. ft. inside facia; 48 lin. ft. ceiling cove; 2 lattice strips 1'6x9'0; 1 wood step for rear door. **Interior Doors:** 1—3'0x7'0-1⅜ (C302); 1—2'0x6'6-1⅜ (C302); 1—2'6x7'0-1⅜ (C302); 1—2'8x6'8-1⅜ (C302); 1—1'8x6'8-1⅜ (C304); 3—2'6x6'8-1⅜ (C304); 6—2'4x6'8-1⅜ (C304); 2—2'6x6'6-1⅜ (C310). **Jambs:** 1—3'0x7'0; 1—2'0x6'6; 1—2'6x7'0; 1—2'8x6'8; 1—1'8x6'8; 3—2'6x6'8; 6—2'4x6'8; 2—2'6x6'6; 2—5'0x7'0 (elliptical top). **Interior Trim:** 6 side trim 10x12-3L; 4 side 10x12-16L; 8 side 10x10-12L; 3 side 10x12-12L; 1 side 3'0x7'0; 1 side 2'8x6'8; 2 side 4'0x7'0; 1 side icing door; 2 side 3'0x7'0; 2 side 2'0x6'6; 2 side 2'6x7'0; 2 side 2'8x6'8; 2 side 1'8x6'8; 6 side 2'6x6'8; 12 side 2'4x6'8; 4 side 2'6x6'6; 4 side 5'0x7'0 (elliptical top); 1 flight basement stairs with rail; 1 flight grade stairs; 1 flight main stairs with rail; 1 broom cabinet; 1 medicine cabinet; 1 scuttle door 24x30; 1 scuttle door jamb; 1 scuttle door side trim; 1 mantel shelf; 1—3'6 cupboard; 1—6'0 seat; 1—4'0 table; 2—3'6 cabinets; 1—2'8 drop leaf table; 530 lin. ft. base; 530 lin. ft. base shoe; 530 lin. ft. base molding; 360 lin. ft. picture molding; 128 lin. ft. ceiling cove; 20 lin. ft. closet shelving; 20 lin. ft. closet hook strip; 14 lin. ft. clothes rod; 18 lin. ft. threshold; 30 lin. ft. band molding; 1 linen closet.
WEATHER STRIPPING—6 sash 10x12-3L; 4 windows 10x12-16L; 8 windows 10x10-12L; 3 windows 10x12-12L; 1 door 3'0x7'0; 1 door 2'8x6'8; 4 doors 2'0x7'0.
CAULKING—21 single frames; 2 single door frames; 2 double door frames; 1 icing door frame; 1 coal chute; 34 lin. ft. chimney.
REINFORCING STEEL—176 sq. ft. chicken netting.
TINWORK—32 lin. ft. ridge roll; 1 finial; 22 lin. ft. porch flashing; 80 lin. ft. dormer flashing; 40 lin. ft. roof flashing; 84 lin. ft. gutter; 22 gutter hangers; 6 gutter ends; 4 nipples; 4 strainers; 4 offsets; 4 elbows; 4 shutoffs; 40 lin. ft. conductor; 12 conductor hooks; 14 lin. ft. chimney flashing; 250 tin shingles.
EXTERIOR PAINTING—30 gal. shingle stain for walls; 6 gal. trim paint; 1 gal. boiled oil; 42 gal. shingle stain roof; 1 gal. porch ceiling paint; 1 gal. porch cement floor paint; 1 gal. screen paint; ½ gal. sash color; ½ gal. shutter color; ½ gal. shellac; 10 lb. putty; 1 gal. japan; 1 gal. turpentine.
INTERIOR PAINTING—12 gal. white paint; 9 gal. enamel; 5 gal. filler stain; 3 gal. shellac; 8 gal. floor varnish; 3½ gal. floor shellac; 2 gal. oil; 1 gal. turpentine; 1 gal. alcohol; 4 doz. sheets sandpaper; 3 lb. steel wool.
HARDWARE—6 cellar sash sets; 15 sash locks; 15 sash lifts; 21 storm sash sets; 21 screen sets; 9 sets shutter hardware for pairs; 1 front door set with butts; 1 rear door set with butts; 2 double door sets with butts; 1 icing door set with butts; 2 st. sh. sets for single; 2 st. sh. sets for double; 2 sc. dr. sets for single; 2 sc. dr. sets for double; 1 floor hinge; 2 push plates; 15 inside door sets with butts; 456 lb. sash weights; 3 hanks sash cord; 1200 lb. assorted nails; 1 coal chute; 6 lb. assorted brads; 20 door bumpers; 4 doz. clothes hooks; 4 stair rail brackets; **Broom Cabinet:** 1 pr. ornamental butts, 1 cupboard turn; **Medicine Cabinet:** 1 cupboard turn, 1 pr. ornamental butts; 1 pr. hinges for scuttle door; **Refrigerator Cabinet:** 2 pr. ornamental butts, 1 cupboard turn, 1 elbow catch; **Two Kitchen Cabinets:** 9 pr. ornamental butts, 5 cupboard turns, 4 elbow catches, 1 set castors for bin, 1 bin pull, 9 drawer pulls; 2 pr. hinges for seat cover; 1 pr. drop leaf table brackets; 6 drawer pulls for linen closet.
INSULATION—1700 ft. ½" vegetable fibre or equal for O. S. walls; 800 ft. ½" vegetable fibre or equal for second floor clng.; 3 rolls felt for floors; 4 rolls felt for roof; 4 rolls felt for walls.

*These numbers refer to Curtis Catalog No. 400.

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Details and quantity survey for House No. 6A60, designed especially for National Builder by The Architects' Small House Service Bureau

Quick-Setting Lime Blocks Developed

A CAST lime building tile for use in making partitions has been developed at the Bureau of Standards by the Fellow of the National Lime Association. The material of which it is made sets so that it can be removed from the mold at the end of ten minutes. After twenty minutes it can be handled, and after seven days it has a compressive strength of 100 pounds per square inch. It can be sawed, and nails can be driven into it.

The material is composed of five parts by volume of ground quicklime, ten of hydrated or slaked lime, and one of wood fiber. It is found to cure best when outdoors exposed to the weather. The new tile is about 20 per cent heavier than gypsum tile of the same size, and experiments are being conducted to see if the core volume can be increased without too great a sacrifice of strength.

The quick-setting lime of which the tile is made was developed several months ago by the Bureau of Standards, and can also be used for other purposes. Difficulty is found in shipping it, however.

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An Attractive Well-Designed Farm House

House No. 6A61, designed especially for National Builder by The Architects' Small House Service Bureau

THERE is a great deal of interest nowadays in efficient, attractive-looking well-designed farm houses. The farm house shown here was designed after a most careful study of farm house designs and recommendations of government experts and of farmers and farm women. The floor plans show beyond question how every feature and detail of this house covers adequately the requirements of a modern farm home.

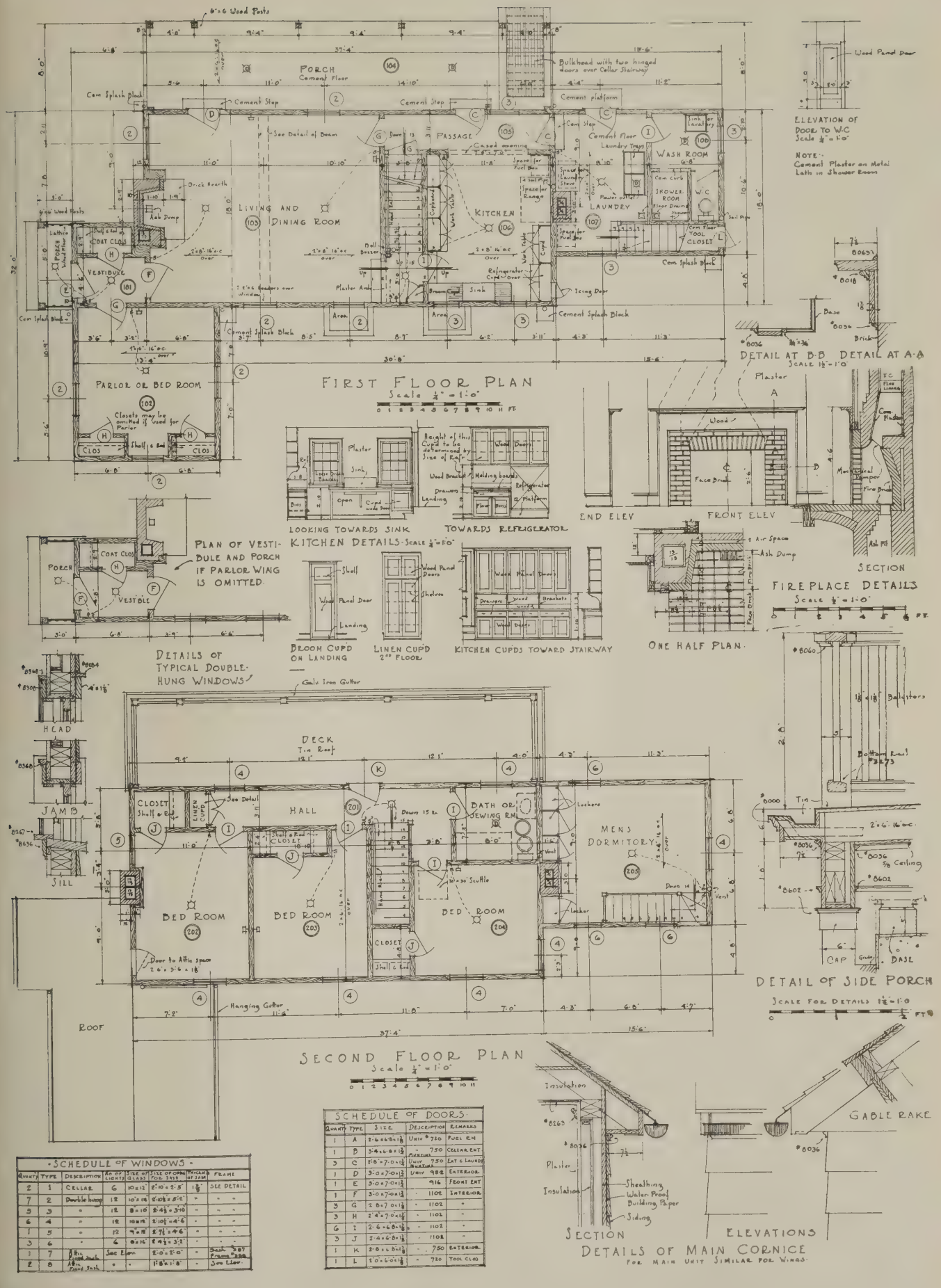
A large comfortable kitchen, large dining room space, and a wash room for the men are absolutely necessary on the farm. A downstairs bedroom is very convenient. Many farmers now want a room for an office. All of these are supplied in this farm house.

This farm house is Colonial in style. Because of its broad and massive lines, it would show up particularly well from the road and fit into the landscape. Finish is wide wood siding nearly to grade with a very low cement base course. The plan type is the same as farm house design 6A56, illustrated in the August issue. It is designed to be built in units as necessity requires. The laundry and washroom and the parlor or bedroom on the first story may be omitted at first. The men's dormitory in the second story may be added when laundry and washroom are built.

Without the men's dormitory, the house still provides three good bedrooms on the second floor, and if the bathroom were omitted, the sleeping accommodations would be still greater. The large porch could be used for serving meals at harvest time, as it has a direct entrance from the kitchen. Living and dining room are practically one big room. The fireplace, of course, can be omitted. Little conveniences have not been overlooked, such as the coat closet in the vestibule, and a linen closet in the second floor hall.

Each bedroom has a good closet. The men's dormitory is reached by a separate stairway. As it receives light and air from three sides it will provide light, airy, sleeping quarters. Downstairs, connected with the laundry, are a washroom, toilet and shower for the men.

The price of this plan is $30.50 (to NATIONAL BUILDER subscribers $15.50).



SCHEDULE OF WINDOWS

Quant.	Type	Description	No. of Lights/Sash	Size of Glass	Size of Opng. for Sash	Thick. of Jamb	Frame
2	1	Cellar	6	10×12	2'-10"×2'-5"	1⅝"	See Detail
7	2	Double hung	12	10"×14"	2'-10½"×5'-6"	"	"
3	3	"	12	8"×10"	2'-4½"×3'-10"	"	"
6	4	"	12	10"×14"	2'-10½"×4'-6"	"	"
1	5	"	12	9"×14"	2'-7½"×4'-6"	"	"
3	6	"	6	8"×16"	2'-4½"×3'-2"	"	"
1	7	8 Lts. Fixed Sash	See Elev.		2'-0"×2'-0"	"	Sash 3.87 Frame 3.88
2	8	10 Lts. Fixed Sash	"	"	1'-8"×1'-8"	"	See Elev.

SCHEDULE OF DOORS

Quantity	Type	Size	Description	Remarks
1	A	2'-6"×6'-8"×1⅜	Univ #720	Fuel Rm
1	B	3'-6"×6'-8"×1⅜	" 750 (Sliding)	Cellar Ent.
3	C	2'-8"×7'-0"×1⅜	Univ 730 (Hinged)	Ent. & Laundry
1	D	3'-0"×7'-0"×1⅜	Univ 982	Exterior
1	E	3'-0"×7'-0"×1⅜	" 916	Front Ent.
1	F	3'-0"×7'-0"×1⅜	" 1102	Interior
3	G	2'-8"×7'-0"×1⅜	" 1102	"
3	H	2'-4"×7'-0"×1⅜	" 1102	"
6	I	2'-6"×6'-8"×1⅜	" 1102	"
3	J	2'-4"×6'-8"×1⅜	" 1102	"
1	K	2'-8"×6'-8"×1⅜	" 750	Exterior
1	L	2'-6"×6'-8"×1⅜	" 720	Tool Clos

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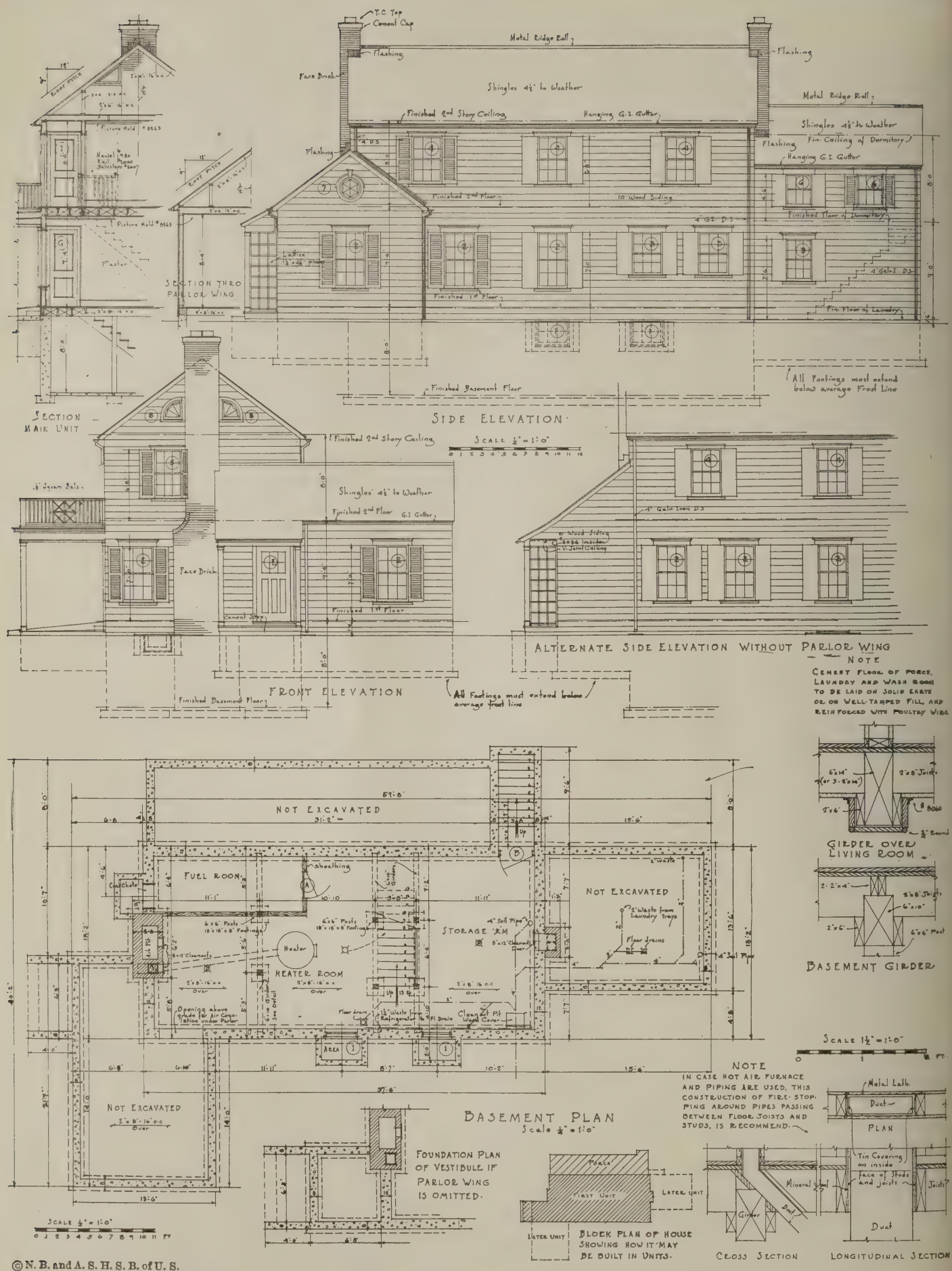
Plans, details and door and window schedules for House No. 6A61, designed especially for National Builder by The Architects' Small House Service Bureau


SECTION MAIN UNIT
SECTION THRO PARLOR WING
SIDE ELEVATION
SCALE ¼" = 1'-0"
ALL FOOTINGS MUST EXTEND BELOW AVERAGE FROST LINE
FRONT ELEVATION
ALTERNATE SIDE ELEVATION WITHOUT PARLOR WING
NOTE
CEMENT FLOOR OF PORCH, LAUNDRY AND WASH ROOM TO BE LAID ON SOLID EARTH OR ON WELL-TAMPED FILL, AND REINFORCED WITH POULTRY WIRE
GIRDER OVER LIVING ROOM
BASEMENT GIRDER
NOT EXCAVATED
FUEL ROOM
HEATER ROOM
STORAGE RM
BASEMENT PLAN
Scale ¼" = 1'-0"
SCALE 1½" = 1'-0"
NOTE
IN CASE HOT AIR FURNACE AND PIPING ARE USED, THIS CONSTRUCTION OF FIRE-STOPPING AROUND PIPES PASSING BETWEEN FLOOR JOISTS AND STUDS, IS RECOMMENDED.
FOUNDATION PLAN OF VESTIBULE IF PARLOR WING IS OMITTED.
BLOCK PLAN OF HOUSE SHOWING HOW IT MAY BE BUILT IN UNITS.
CROSS SECTION
LONGITUDINAL SECTION
PLAN

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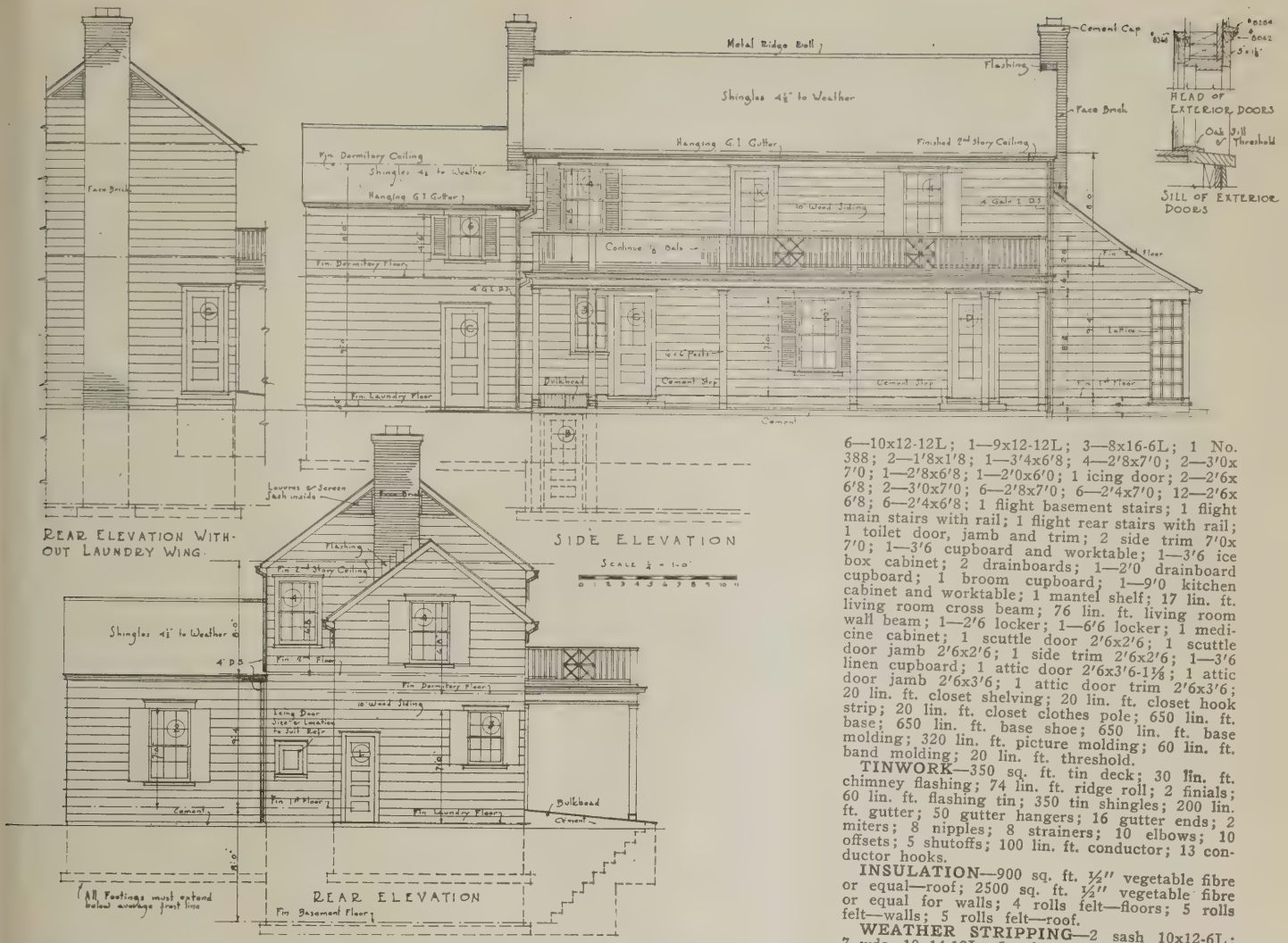
Elevations, basement plan and details for House No. 6A61, designed especially for National Builder by The Architects' Small House Service Bureau



EXCAVATING—210 cu. yd.
BACKFILL—56 cu. yd.
FOUNDATION—If 12" concrete, 62 cu. yd. gravel, 250 sax cement; if 9" concrete, 53 cu. yd. gravel, 214 sax cement; if 12" tile, 30200 CBM tile, 21 cu. yd. mortar; if 9" tile, 25700 CBM tile, 18 cu. yd. mortar.
CEMENT FLOORS—8 cu. yd. gravel; 6 cu. yd. sand; 86 sax cement; 4 cement spatter blocks.
CHIMNEYS—3440 common brick; 960 face brick; 100 fire brick; 12 sq. ft. hearth tile; 180 inside face brick, 68 lin. ft. 8x12 flue tile; 68 lin. ft. 8x8 flue tile; 20 lb. fire clay; 4 cu. yd. mortar; 1 cast-iron ash dump; 1 throat and damper; 1 angle 4x3x5/16—4'0; 3—8x12 cleanout doors; 1—8" thimble; 3—6" adjustable thimbles; 8 yd. metal lath.
LATH—9 yd. metal lath over furnace; 13400 wood lath.
PLASTER—9 yd. plaster on metal lath; 953 yd. plaster on wood lath; 14 yd. Keene's cement.
TILE FLOORS—48 sq. ft. ceramic tile; 25 lin. ft. cove base.
LUMBER—6—6x6-7 posts; 3—6x10-18 girders; 6—2x4-18 girder ribbon; 4 ft. of 2" plank cleanout cover; 60 lin. ft. 2x4 basement partition plates; 16—2x4-7 basement partition studs; 200 ft. D & M basement partition sheathing; 3—2x10-14 basement stair horses; **First Floor Joist**: 15—2x8-16; 15—2x8-22; 6—2x8-7; 13—2x8-14; 64 lin. ft. 2x8 box sill; 320 lin. ft. bridging; 4—2x8-12 headers; 1010 ft. com. bds. first floor subfloor; 1242 ft. 13/16x1½ first floor finish floors; 390 lin. ft. 2x4 first floor partition plates; 120—2x4-9 first floor partition studs; 3—2x10-16 stair horses; 1200 lin. ft. grounds; 96 lin. ft. 1x4 ribbon; **Second Floor Joist**: 13-2x10-14; 15—2x8-16; 15—2x8-22; 13—2x6-14; **Second Floor Joist Headers**: 2—2x10-12; 3—2x8-12; 900 ft. com. bds. second floor subfloor; 1100 ft. 13/16x1½ second floor finish floor; 327 lin. ft. 2x4 second floor partition plates; 97—2x4-8 second floor partition studs; 29—2x6-18 second floor ceiling joist; 13—2x4-7 second floor ceiling joist; 534 lin. ft. 2x4 outside wall plates; **Outside Wall Studs**: 39—2x4-14; 92—2x4-18; 46—2x4-10; 10—2x4-16 gable studs; **Opening Headers and Doubles**: 12—2x4-16; 8—2x4-14; **Rafters**: 24—2x4-9; 58—2x4-12; 16—2x4-18; 6—2x4-14; 76 lin. ft. 1x6 ridge rafter; 1900 ft. com. bds. roof sheathing; 14 M shingles; 400 ft. D & M porch roofing; **Porch Girders**: 4—2x8-8; 4—2x8-14; 2—2x8-10; 2—2x8-8; 2—2x8-6; 400 ft. ceiling porch; 3800 ft. shiplap wall sheathing; 3400 ft. 10" siding; 29—2x6-8 porch roof joist; 29—2x4-8 porch ceiling joist; **Bulkhead Framing**: 1—2x8-22; 1—2x6-22; 25—2x4-16 lookouts; **Scaffold and Extras**: 25—2x4-18; 10—2x6-14; 4—2x8-16; 3—2x10-14; 4—2x12-16.

MILLWORK—Frames: 2 cellar 10x12-6L-1⅜; 7 wd. 10x14-12L-1⅜; 5 wd. 8x10-12L-1⅜; 6 wd. 10x12-12L-1⅜; 1 wd. 9x12-12L-1⅜; 3 wd. 8x16-6L-1⅜; 1 sash No. 388—1⅜; 2 sash 1'8x1'8-1⅜. **Windows**: 2 sash 10x12-6L-1⅜; 7 wds. 10x14-12L-1⅜; 5 wds. 8x10-12L-1⅜; 6 wds. 10x12-12L-1⅜; 1 wd. 9x12-12L-1⅜; 3 wds. 8x16-6L-1⅜; 1 sash No. 388-1⅜; 2 sash 1'8x1'8-1⅜. **Storm Sash**: 2—10x12-6L-1⅛; 7—10x14-12L-1⅛; 5—8x10-12L-1⅛; 6—10x12-12L-1⅛; 1—9x12-12L-1⅛; 3—8x16-6L-1⅛; 1 No. 388; 2—1'8x1'8. **Screens**: 2—10x12-6L-1⅛; 7—10x14-12L-1⅛; 5—8x10-12L-1⅛; 6—10x12-12L-1⅛; 1—9x12-12L-1⅛; 3—8x16-6L-1⅛; 1 No. 388-1⅛; 2—1'8x1'8-1⅛. **Shutters**: 7 pr. for wds. 10x14-12L-1⅛; 5 pr. for wds. 8x10-12L-1⅛; 6 pr. for wds. 10x12-12L-1⅛; 1 pr. for wds. 9x12-12L-1⅛; 3 pr. for wds. 8x16-6L-1⅛. **Outside Door Frames**: 1 bulk head; 1—3'4x6'8-1¾; 3—2'8x7'0-1¾; 2—3'0x7'0-1¾; 1—2'8x6'8-1⅜; 1—2'0x6'0-1⅜; 1 icing door frame. **Outside Doors**: 1 bulk head; 1—3'4x6'8-1¾ (No. 750); 3—2'8x7'0-1¾ (No. 750); 1—3'0x7'0-1¾ (No. 982); 1—3'0x7'0-1¾ (No. 916); 1—2'8x6'8-1⅜ (No. 750); 1—2'0x6'0-1⅜ (No. 720); 1 icing door. **Storm Doors**—1—3'4x6'8-1⅛; 2—2'8x7'0-1⅛; 2—3'0x7'0-1⅛; 1—2'8x6'8-1⅛; 1—2'0x6'0-1⅛. **Screen Doors**: 1—3'4x6'8-1⅛; 2—2'8x7'0-1⅛; 2—3'0x7'0-1⅛; 1—2'8x6'8-1⅛; 1—2'0x6'0-1⅛. **Exterior Millwork**: 302 lin. ft. cornice; 54 lin. ft. porch deck rail and newels; 50 lin. ft. porch facia; 50 lin. ft. porch soffit; 50 lin. ft. porch inside facia; 100 lin. ft. porch cove; 8 porch posts; 2 half posts; 2 lattice frames 2'6x7'6. **Interior Doors**: 1—2'6x6'8-1⅜ (No. 720); 1—3'0x7'0-1¾ (No. 1102); 3—2'8x7'0-1⅜ (No. 1102); 3—2'4x7'0-1⅜ (No. 1102); 6—2'6x6'8-1⅜ (No. 1102); 3—2'4x6'8-1⅜ (No. 1102). **Jambs**: 1—2'6x6'8; 1—3'0x7'0; 3—2'8x7'0; 3—2'4x7'0; 6—2'6x6'8; 3—2'4x6'8; 1—7'0x7'0. **Interior Trim**: 2 side trim 10x12-6L; 7—10x14-12L; 5—8x10-12L; 6—10x12-12L; 1—9x12-12L; 3—8x16-6L; 1 No. 388; 2—1'8x1'8; 1—3'4x6'8; 4—2'8x7'0; 2—3'0x7'0; 1—2'8x6'8; 1—2'0x6'0; 1 icing door; 2—2'6x6'8; 2—3'0x7'0; 6—2'8x7'0; 6—2'4x7'0; 12—2'6x6'8; 6—2'4x6'8; 1 flight basement stairs; 1 flight main stairs with rail; 1 flight rear stairs with rail; 1 toilet door, jamb and trim; 2 side trim 7'0x7'0; 1—3'6 cupboard and worktable; 1—3'6 ice box cabinet; 2 drainboards; 1—2'0 drainboard cupboard; 1 broom cupboard; 1—9'0 kitchen cabinet and worktable; 1 mantel shelf; 17 lin. ft. living room cross beam; 76 lin. ft. living room wall beam; 1—2'6 locker; 1—6'6 locker; 1 medicine cabinet; 1 scuttle door 2'6x2'6; 1 scuttle door jamb 2'6x2'6; 1 side trim 2'6x2'6; 1—3'6 linen cupboard; 1 attic door 2'6x3'6-1⅛; 1 attic door jamb 2'6x3'6; 1 attic door trim 2'6x3'6; 20 lin. ft. closet shelving; 20 lin. ft. closet hook strip; 20 lin. ft. closet clothes pole; 650 lin. ft. base; 650 lin. ft. base shoe; 650 lin. ft. base molding; 320 lin. ft. picture molding; 60 lin. ft. band molding; 20 lin. ft. threshold.
TINWORK—350 sq. ft. tin deck; 30 lin. ft. chimney flashing; 74 lin. ft. ridge roll; 2 finials; 60 lin. ft. flashing tin; 350 tin shingles; 200 lin. ft. gutter; 50 gutter hangers; 16 gutter ends; 2 miters; 8 nipples; 8 strainers; 10 elbows; 10 offsets; 5 shutoffs; 100 lin. ft. conductor; 13 conductor hooks.
INSULATION—900 sq. ft. ½" vegetable fibre or equal—roof; 2500 sq. ft. ½" vegetable fibre or equal for walls; 4 rolls felt—floors; 5 rolls felt—walls; 5 rolls felt—roof.
WEATHER STRIPPING—2 sash 10x12-6L; 7 wds. 10x14-12L; 5 wds. 8x10-12L; 6 wds. 10x12-12L; 1 wd. 9x12-12L; 3 wd. 8x16-6L; 1 dr. 3'4x6'8; 2 dr. 2'8x7'0; 2 dr. 3'0x7'0; 1 dr. 2'8x6'8; 1 dr. 2'0x6'0.
CAULKING—27 window frames; 8 door frames; 1 icing frame; 2 chimneys.
HARDWARE—2 cellar sash sets; 22 sash locks; 22 sash lifts; 3 sets attic sash hinges and locks; 27 storm sash sets; 27 screen sets; 22 sets shutter hardware for pairs; 1 set bulk head door hinges and lock; 8 outside door sets with butts; 1 icing door set with butts; 7 storm door sets with butts; 7 screen door sets with butts; 1 floor hinge; 2 push plates; 16 inside door sets with butts; 6 stair rail brackets; 4 dozen clothes hooks; 24 door bumpers; 1300 lb. nails; 6 lb. brads; 1 coal chute; 670 lb. sash weights; 5 hanks sash cord; 45 anchor bolts; 1 pr. hinges and lock for toilet door; for 3'6 cupboard: 2 pr. ornamental butts, 1 cupboard turn, 1 blind catch, 2 sets castors for bins, 2 bin pulls, 2 molding board pulls; for ice box cabinet: 2 pr. ornamental butts, 1 cupboard turn, 1 blind catch; for drainboard cabinet: 1 pr. ornamental butts, 1 cupboard turn; for broom cabinet: 1 cupboard turn, 1 pr. ornamental butts; for linen cabinet: 4 pr. ornamental butts, 2 cupboard turns, 2 blind catches; for medicine cabinet: 1 pr. ornamental butts, 1 cupboard turn; for kitchen cabinet: 12 pr. ornamental butts, 6 cupboard turns, 6 elbow catches, 6 drawer pulls; 1 pr. hinges for scuttle door; for attic door: 1 pr. hinges, 1 cupboard turn; for locker doors: 4 pr. hinges, 4 cupboard turns.
EXTERIOR PAINTING—15 gal. body paint; 6 gal. trim paint; 3 gal. boiled oil; 42 gal. shingle stain; 3 gal. cement paint; 1 gal. screen paint; 1 gal. sash paint; 1 gal. shellac; ½ gal. shutter paint; 2 gal. japan; 1 gal. turpentine; 10 lb. putty.
INTERIOR PAINTING—14 gal. white paint; 9 gal. enamel; 5 gal. filler; 3 gal. shellac; 10 gal. varnish; 3 gal. floor shellac; 5 gal. floor varnish; 2 gal. cement floor paint; 2 gal. oil; 1 gal. japan; 1 gal. turpentine; 1 gal. alcohol; 4 doz. sheets sandpaper; 4 lb. steel wool.
REINFORCING—256 sq. ft. chicken netting porch floor; 200 sq. ft. chicken netting laundry floor; 14—⅜ rods, 13'0; 32—⅜ rods, 8'0.

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Elevations and quantity survey for House No. 6A61, designed especially for National Builder by The Architects' Small House Service Bureau

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A Large Front Porch, with Sun Room in Rear If Desired

House No. 5A62, designed especially for National Builder by The Architects' Small House Service Bureau

THE present demand for compact, conveniently arranged interiors is well answered by this plan for a five-room house. This is based on the same popular, practical plan as houses 5A50, illustrated in the January issue (stucco on tile), and 5A52, illustrated in the March issue (siding exterior on wood frame).

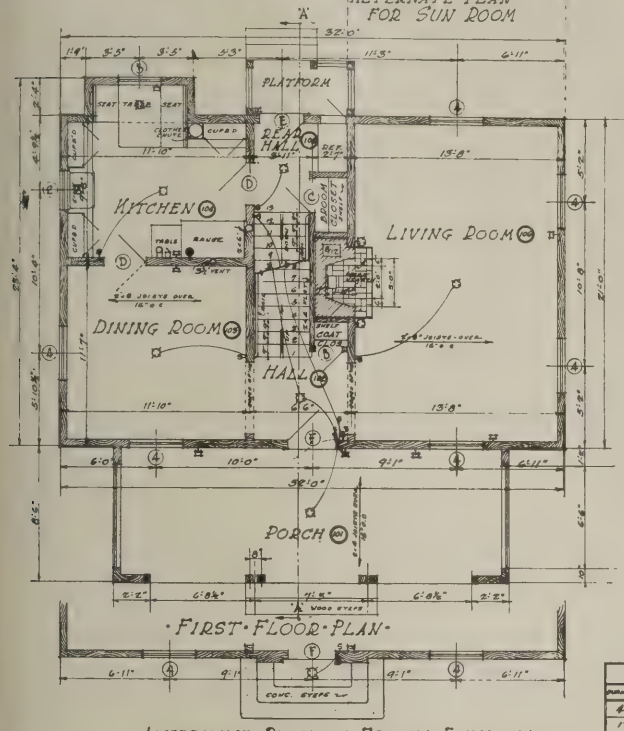
This might be called Western in style, due to the horizontal lines. Construction is frame with exterior finish of shingles or wide siding. It can be built on a 40 to 45-foot lot and is designed to face west or north. It should be reversed for other facings.

As pictured above, the house has a large open front porch. Alternate drawings for sun porch to be added to the rear with alternate front entrance are provided in the working drawings. This is an especially good plan, as it gets five good rooms into a limited space. There is no space that is not room space. There are practically no hallways to waste room. The plan belongs to the popular center stairway type. The living room runs from front to back on one side with light and air from three sides.

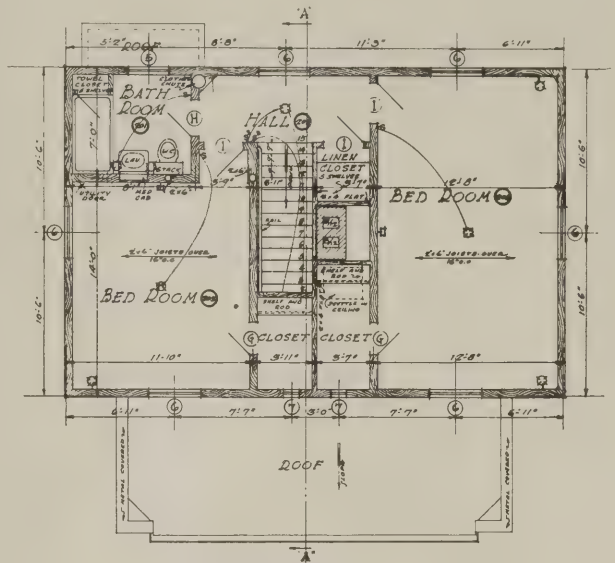
The wide cased openings between living room, dining room and hall are desirable. The conveniences of modern living are well supplied. There is a coat closet in the front hall; dining alcove with built-in seats and table for the kitchen; a clothes chute in the kitchen and on the second floor; and a good linen closet. There are two good size bedrooms on the second floor.

Some people feel that an attic is only a storage for things one hasn't the courage to throw away, while others consider an attic indispensable. This house can have an attic if desired, reached by stairs in the closet of the larger bedroom.

The price of this plan is $25.50 (to NATIONAL BUILDER subscribers $13.00).



ALTERNATE PLAN OF FRONT ENTRANCE

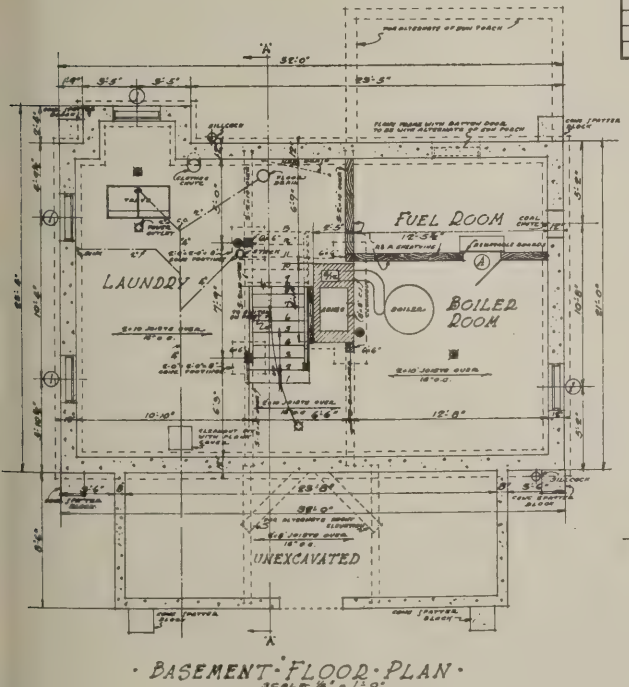


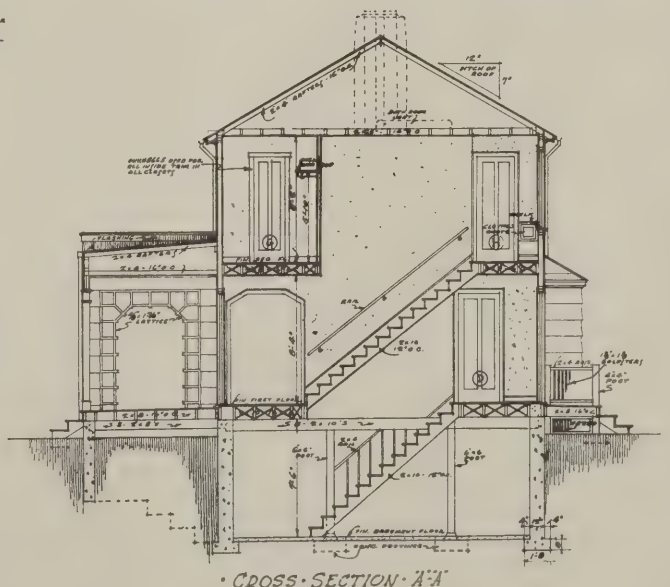
· SCHEDULE OF WINDOWS ·

QUANTITY	TYPE	DESCRIPTION	NO. OF LIGHTS GLASS	SIZE OF SASH FOR GLASS	SASH	FRAME
4	1	BASEMENT SASH	3	10×12	2'-10"×1'-5"	1⅝"	PLAIN
1	2	DOUBLE-HUNG	12	8×10	2'-8"×3'-10"	1⅝"	SEE DETAIL
1	3	" "	12	9×12	2'-7"×3'-6"	"	" "
6	4	" "	16	9×15	3'-8⅝"×4'-10"	"	" "
1	5	" "	12	9×12	2'-7"×3'-6"	"	" "
6	6	" "	16	9×12	3'-8⅝"×3'-6"	"	" "
2	7	SASH	1	8×18	1'-10"×1'-11"	"	

· SCHEDULE OF DOORS ·

QUANTITY	TYPE	SIZE	DESCRIPTION	REMARKS
1	A	2'-6"×6'-6⅝"	5 CROSS PANEL	
1	B	1'-8"×7'-0"×1⅜"	DWG # 903	
1	C	2'-0"×7'-0"×1⅜"	" "	
2	D	2'-8"×7'-0"×1⅜"	" "	
1	E	2'-8"×7'-0"×1⅜"	SEE REAR ELEV.	
1	F	3'-0"×7'-0"×1⅜"	SEE FRONT ELEV.	
2	G	2'-0"×6'-8"×1⅜"	DWG # 903	
1	H	2'-6"×6'-8"×1⅜"	" "	
3	I	2'-6"×6'-8"×1⅜"	" "	





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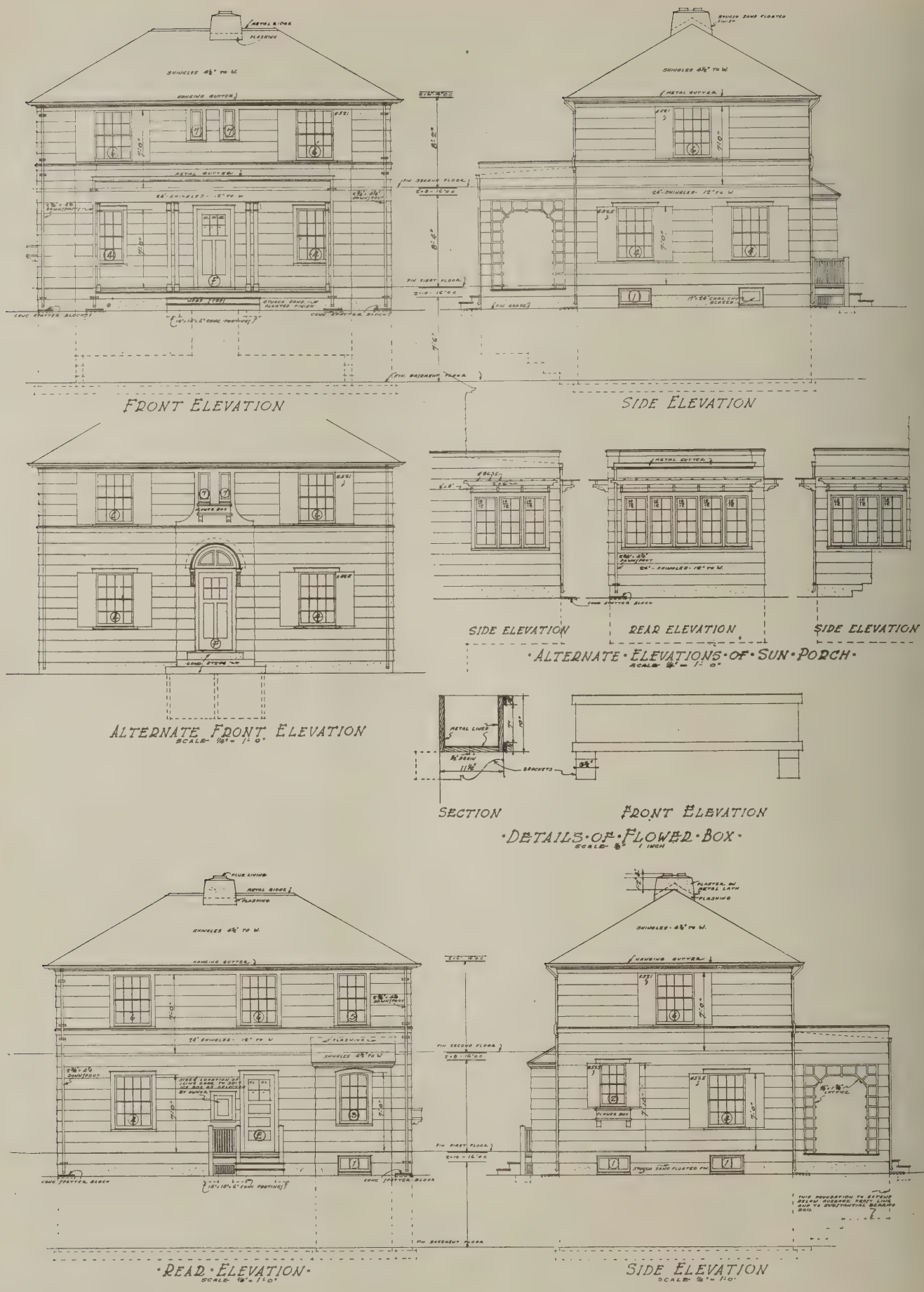
Plans, details, door and window schedules and section for House No. 5A62, designed especially for National Builder by The Architects' Small House Service Bureau



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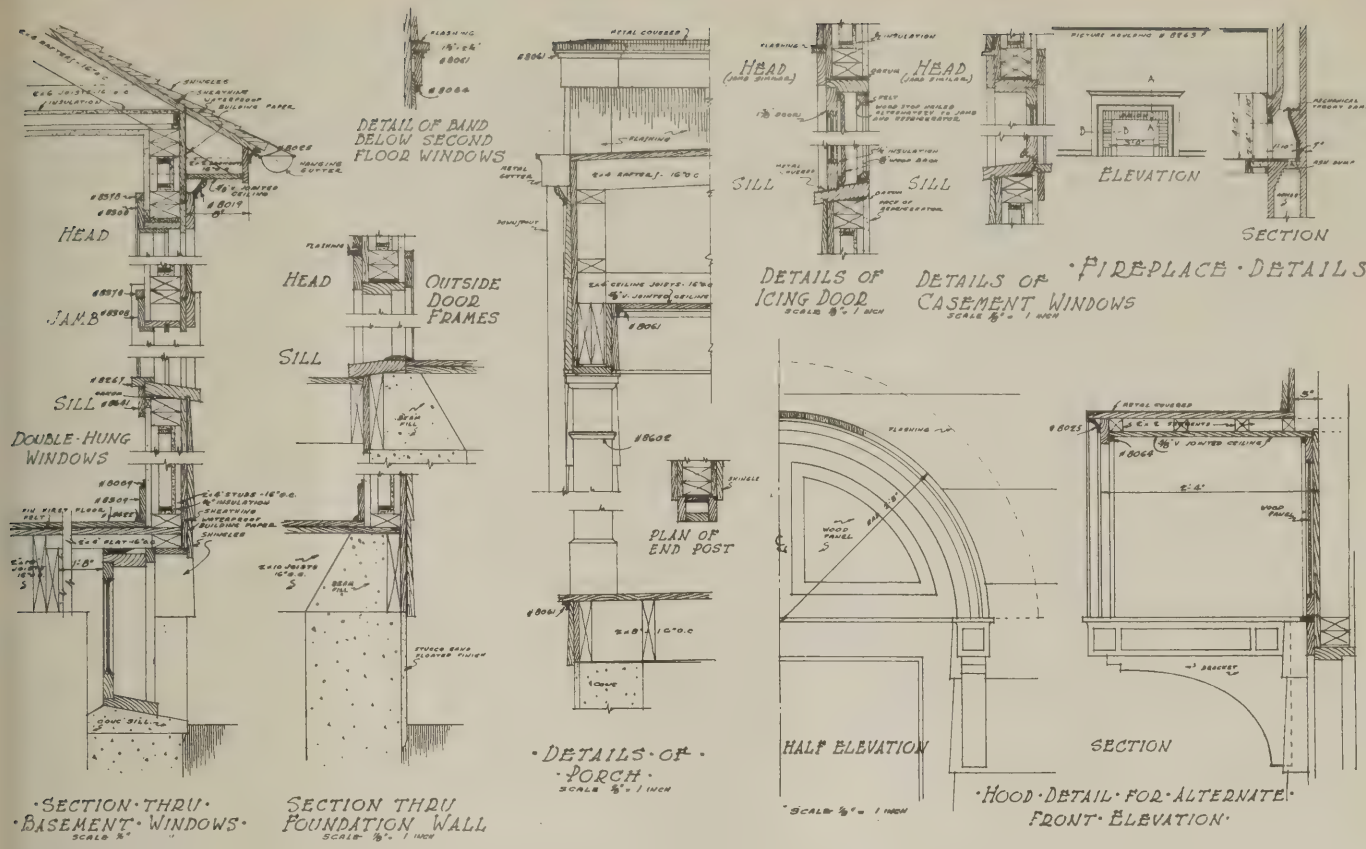
Elevations for House No. 5A62, designed especially for National Builder by The Architects' Small House Service Bureau



EXCAVATING—180 cu. yd.
BACKFILL—40 cu. yd.
FOUNDATION—If 12″ concrete, 44 cu. yd. gravel, 178 sax cement; if 9″ concrete, 35 cu. yd. gravel, 142 sax cement; if 12″ tile, 21000 CBM tile, 15 cu. yd. mortar; if 9″ tile, 16600 CBM tile, 12 cu. yd. mortar.

CEMENT FLOORS—4 cu. yd. gravel; 3 cu. yd. sand; 43 sax cement; 5 cement spatter blocks.

CHIMNEY—3000 common brick; 100 fire brick; 12 sq. ft. hearth tile; 160 inside face brick; 54 lin. ft. 8x12 flue tile; 20 lb. fire clay; 3 cu. yd. mortar; 1 cast iron ash dump; 1 throat and damper; 1 angle 4x3x5/16—4′0; 2—8x8 cleanout doors; 1—8″ thimble; 2—6″ thimble; 5 yd. metal lath.

LATH—9 yd. metal lath over boiler; 8800 wood lath.

PLASTER—9 sq. yd. plaster on metal lath; 630 sq. yd. plaster on wood lath; 14 sq. yd. Keene's cement; 14 sq. yd. plaster on cement wall.

TILE—48 sq. ft. ceramic tile; 25 lin. ft. cove base.

LUMBER—4—6x6-7 posts; 1—4x4-7 posts; 108 lin. ft. 2x10 girders; 6—2x8-9 girders; 4 ft. of plank cleanout cover; 3—2x10-14 stair horses; 60 lin. ft. 2x4 basement partition plates; 16—2x4-7 basement partition studs; 200 ft. D & M basement partition sheathing; 8—2x8-24 porch joist; 2—2x8-9 porch joist girders; 280 ft. fir flooring porch floor; 280 ft. ceiling porch ceiling; **First Floor Joist:** 17—2x10-14; 18—2x10-18; 72 lin. ft. 2x10 box sill; **Joist Doubles:** 2—2x10-14; 2—2x10-16; 300 lin. ft. 1x3 bridging; 900 lin. ft. grounds; 740 ft. com. bds. sub floor first floor; 930 ft. 13/16x1½ first floor finish floor; 312 lin. ft. 2x4 outside wall plates; 84—2x4-18 outside wall studs; 8—2x4-16 opening headers; 20—2x4-14 opening doubles; 2100 ft. shiplap wall sheathing; 6000—24″ shingles; 25—2x4-16 lookouts; 228 lin. ft. 2x4 first floor partition plates; 67—2x4-9 first floor partition studs; 3—2x10-16 stair horses; 20—2x4-9 porch ceiling joist; 20—2x4-9 porch rafters; 3—2x4-7 bay rafters; 2—2x4-14 bay ceiling joist; **Second Floor Joist:** 17—2x8-14; 18—2x8-18; 4—2x8-16 headers and doubles; 700 ft. com. bds. second floor subfloor; 870 ft. 13/16x1½ second floor finish floor; 240 lin. ft. 2x4 second floor partition plates; 70—2x4-8 second floor partition studs; 42 lin. ft. 1x4 ribbon; **Second Floor Ceiling Joist:** 17—2x6-14; 17—2x6-18; 780 ft. D&M attic floor; 1—2x6-8 platform header; 3—2x6-7 platform joist; 30 ft. flooring platform; 1—2x10-8 step horses; 1—2x10-10 front step horse; 1—1x6-12 ridge rafter; 4—2x4-14 hip rafters; 70—2x4-14 rafters; 1600 ft. com. bds. roof sheathing; 2 squares prepared roofing for porch; 12½M shingles; **Scaffold and Extras:** 25—2x4-18; 8—2x6-16; 4—2x10-12.

MILLWORK—Frames: 4 sash frames 10x12-3L-1⅜; 1 window frame 8x10-12L-1⅜; 1—9x12-12L-1⅜ (seg. top); 6—9x13-16L-1⅜; 1—9x12-12L-1⅜; 6—9x12-16L-1⅜; 2 sh. frames 8x18-1L-1⅜. **Windows:** 4 sh. 10x12-3L-1⅜; 1 wd. 8x10-12L-1⅜; 1—9x12-12L-1⅜ (seg. top); 6—9x13-16L-1⅜; 1—9x12-12L-1⅜; 6—9x12-16L-1⅜; 2 sh. 8x18-1L-1⅜. **Storm Sash:** 4—10x12-3L-1⅛; 1—8x10-12L-1⅛; 1—9x12-12L-1⅛ (seg. top); 6—9x13-16L-1⅛; 1—9x12-12L-1⅛; 6—9x12-16L-1⅛; 2—8x18-1L-1⅛. **Screens:** 4—10x12-3L-1⅛; 1—8x10-12L-1⅛; 1—9x12-12L-1⅛ (seg. top); 6—9x13-16L-1⅛; 1—9x12-12L-1⅛; 6—9x12-16L-1⅛; 2—8x18-1L-1⅛. **Shutters:** 1 pr. for 8x10-12L wd.; 3 pr. for 9x13-16L wd.; 4 pr. for 9x12-16L wd. **Outside Door Frames:** 1—2′8x7′0-1¾; 1—3′0x7′0-1¾; 1 icing door frame. **Outside Doors:** 1—2′8x7′0-1¾; 1—3′0x7′0-1¾; 1 icing door. **Storm Doors:** 1—2′8x7′0-1⅛; 1—3′0x7′0-1⅛. **Screen Doors:** 1—2′8x7′0-1⅛; 1—3′0x7′0-1⅛. **Outside Millwork:** 1 set front steps 8′3″; 1 set rear steps 4′6″; 5 platform newels; 8 lin. ft. platform rail; 4 porch posts 8′0; 2—½ porch posts 8′0; 40 lin. ft. porch base; 40 lin. ft. porch outside facia; 40 lin. ft. porch soffit; 40 lin. ft. porch inside facia; 18 lin. ft. deck rail; 108 lin. ft. belt; 108 lin. ft. water drip; 128 lin. ft. cornice; 1 flower box; 2 flower box brackets; 14 sq. ft. lattice work; 15 lin. ft. platform base; 64 lin. ft. ceiling cove; 2 lattice frames 7′9x7′6. **Interior Doors:** 1—2′6x6′6-1⅜ (5XP); 1—1′8x7′0-1¾ (No. 903); 1—2′0x7′0-1⅜ (No. 903); 2—2′8x7′0-1¾ (No. 903); 2—2′0x6′8-1⅜ (No. 903); 1—2′4x6′8-1¾ (No. 903); 3—2′6x6′8-1⅜ (No. 903). **Jambs:** 1—2′6x6′6; 1—1′8x7′0; 1—2′0x7′0; 2—2′8x7′0; 2—2′0x6′8; 1—2′4x6′8; 3—2′6x6′8; 2—4′6x7′0. **Interior Trim:** 4 side 10x12-3L; 1 side 8x10-12L; 1 side 9x12-12L; 6 side 9x13-16L; 1 side 9x12-12L; 6 side 9x12-16L; 2 side 8x18-1L; 1 side 2′8x7′0; 1 side 3′0x7′0; 1 side icing door; 2 side 2′6x6′6; 2 side 1′8x7′0; 2 side 2′0x7′0; 4 side 2′8x7′0; 4 side 2′0x6′8; 2 side 2′4x6′8; 6 side 2′6x6′8; 4 side 4′6x7′0; 1 flight basement stairs with rail; 1 flight main stairs with rail; 1 towel cabinet; 2 clothes chute doors; 2 clothes chute door jambs; 2 clothes chute door side trim; 1 medicine cabinet; 1 scuttle door; 1 scuttle door jamb; 1 scuttle door side trim; 5 linen closet shelves; 1 mantel shelf; 1 refrigerator cabinet; 1—2′8 kitchen cupboard; 1—4′0 seat; 1—2′0 seat; 1—4′0 table; 2—3′0 cupboards; 2 drain boards; 1—2′0 table; 450 lin. ft. base; 450 lin. ft. base shoe; 450 lin. ft. base molding; 280 lin. ft. picture molding; 20 lin. ft. closet shelving; 20 lin. ft. closet hook strip; 14 lin. ft. closet clothes rod; 34 lin. ft. chair rail; 126 lin. ft. ceiling cove; 6 lin. ft. threshold; 1 utility door; 1 utility door jamb; 1 utility door side trim.

INSULATION—1600 ft. ½″ vegetable fibre or equal for walls; 620 ft. ½″ vegetable fibre or equal for ceiling; 4 rolls felt walls; 3 rolls felt floors; 4 rolls felt roof.

CAULKING—21 frames; 3 door frames; 1 coal chute.

WEATHER STRIPS—4 sh. 10x12-3L; 1 wd. 8x10-12L; 1 wd. 9x12-12L; 6 wd. 9x13-16L; 1 wd. 9x12-12L; 6 wd. 9x12-16L; 2 sh. 8x18-1L; 1 dr. 2′8x7′0; 1 dr. 3′0x7′0; 1 icing door.

TINWORK—136 lin. ft. gutter; 4 outside miters; 2 gutter ends; 5 nipples; 5 strainers; 5 elbows; 5 offsets; 5 shut offs; 40 gutter hangers; 90 lin. ft. conductor pipe 15 conductor hooks; 1 flower box lining; 1 clothes chute; 40 lin. ft. flashing; 12 lin. ft. ridge roll; 2 finials; 60 lin. ft. hip roll; 14 lin. ft. chimney flashing; 200 tin shingles; 108 lin. ft. belt flashing.

HARDWARE—4 cellar sash sets; 15 sash locks; 15 sash lifts; 2 casement sash sets; 21 storm sash sets; 21 screen sash sets; 8 sets shutter hardware for pairs; 1 front door set with butts; 1 rear door set with butts; 1 icing door set with butts; 2 storm door sets with butts; 2 screen door sets with butts; 1 floor hinge; 2 push plates; 10 inside door sets with butts; 13 door bumpers; 4 doz. clothes hooks; 4 stair rail brackets; 440 lb. sash weights; 3 hanks sash cord; 1 coal chute; 900 lb. assorted nails; 5 lb. assorted brads; for medicine cabinet: 1 pr. ornamental butts, 1 cupboard turn; for ice box cabinet: 1 cupboard turn, 1 blind catch, 2 pr. ornamental butts; 2 pr. hinges for seats; for clothes chute: 2 pr. ornamental butts, 2 cupboard turns; 1 pr. hinges for scuttle door; for kitchen cabinet: 5 pr. ornamental butts, 3 cupboard turns, 2 elbow catches, 2 drawer pulls; for kitchen cabinets: 6 pr. ornamental butts, 3 cupboard turns, 3 elbow catches, 1 set castors, 1 bin pull, 7 drawer pulls; 1 pr. drop leaf brackets for table; 4 friction stays—utility door.

EXTERIOR PAINTING—4 gal. trim paint; 22 gal. shingle stain walls; 3 gal. boiled oil; 38 gal. shingle stain roof; 1 gal. porch floor paint; ½ gal screen paint; ½ gal. sash color; ½ gal. shutter paint; ½ gal. shellac; 10 lb. putty; 1 gal. japan; 1 gal. turpentine.

INTERIOR PAINT—11 gal. white paint; 7 gal. enamel; 4 gal. filler stain; 3 gal. shellac; 8 gal. varnish; 3 gal. floor shellac; 4 gal. floor varnish; 2 gal. oil; 1 gal. japan; 1 gal. turpentine; 1 gal. alcohol; 4 doz. sheets sandpaper; 3 lb. steel wool. NOTE: If living room and dining room trim is changed, it will affect the following items: 1 dr. 3′0x7′0-1¾; 1 side trim 3′0x7′0; 1 dr. 1′8x7′0-1⅜ (No. 903); 1 side trim 1′8x7′0; 1 dr. 2′8x7′0-1¾ (No. 903); 1 jamb 2′8x7′0; 1 side trim 2′8x7′0; 2 jambs 4′6x7′0; 4 side trim 4′6x7′0; 1 mantel shelf; 1 flight main stairs with rail; 126 lin. ft. ceiling cove; 116 lin. ft. base; 116 lin. ft. base shoe; 116 lin. ft. base molding; 120 lin. ft. picture molding; 6 side trim 9x13-16L; 640 ft. 13/16x1½ finish floors.

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Details and quantity survey for House No. 5A62, designed especially for National Builder by The Architects' Small House Service Bureau

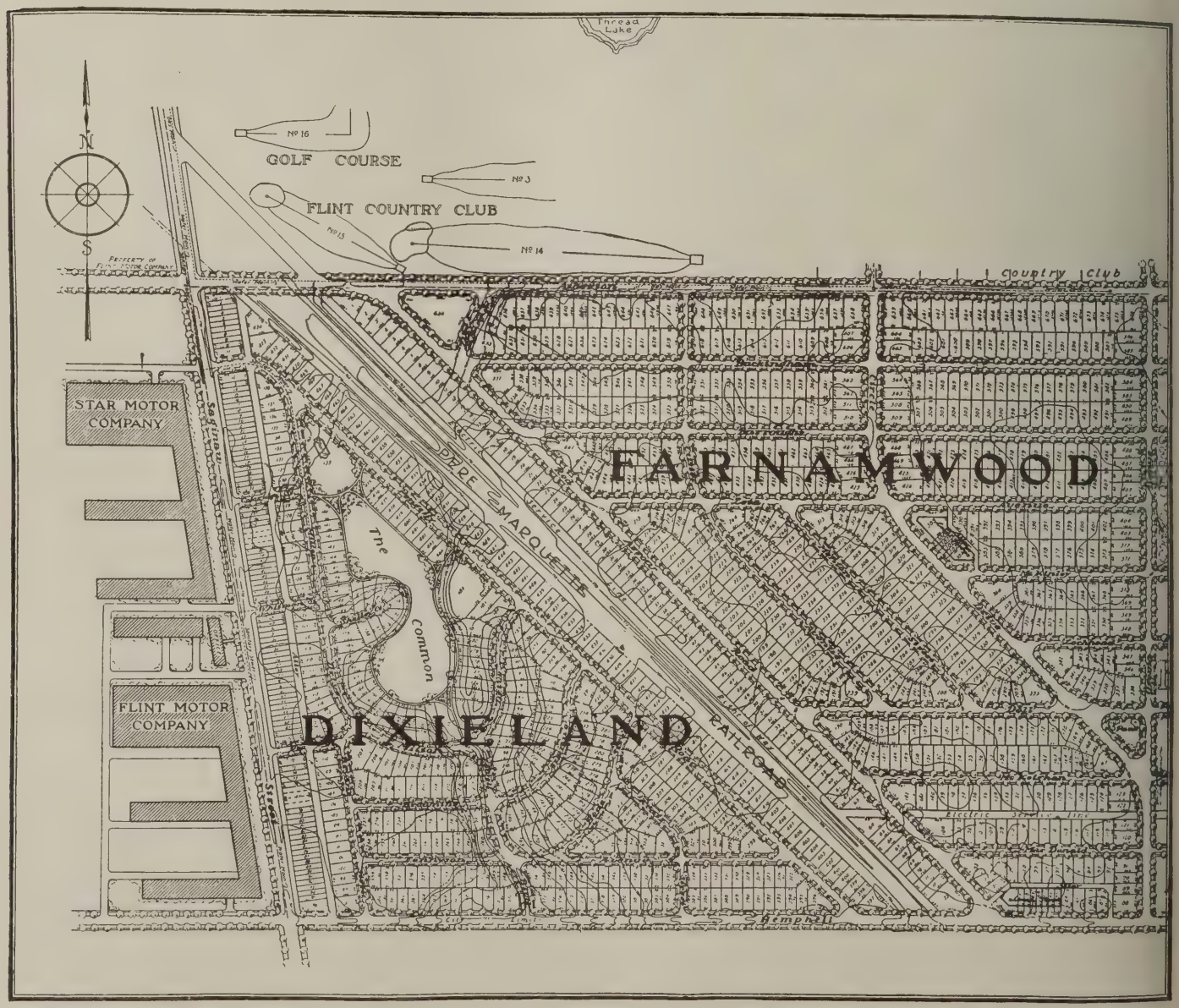
A Daring Building Project in the City of Flint, Michigan

The Central Construction Company Have Started Work on 200 Bungalows of Spanish Type, Duplicating Their Other Successful Developments in Seabreeze, Florida, and Villa Park, Illinois

IT has been often said that there is nothing new under the sun. The originator of this statement undoubtedly "said a mouthful" when he uttered it, but sometimes one hesitates to think of it as applying to everything "under the sun." Take, for instance, the Spanish village development of the Central Construction Company at Flint, Michigan.

The writer will grant that housing developments have been carried out successfully on a large scale in all parts of the country. He will admit that the Spanish type house is not new. He will agree that large numbers of Spanish type houses have been built before. But he will put up a mighty stiff argument when he is called upon to accept the statement that a housing development involving the construction of over 200 Spanish type bungalows and two-story houses has been put over before in a Middle Western town of less than a hundred thousand population.

Two hundred Spanish type houses!



Plot plan of the Central Construction Company development at Flint, Michigan. Notice that the grounds are bounded on one side by the Flint Country Club and on the other by the Flint and Star Motor Works

The Central Constructon Company buy all materials for their building in large quantities. This is a view of the storage yard

That is the ambition of the Central Construction Company, now building at Flint, Michigan, before their program is finished, and from all present indications they are assured an overwhelming success. Twelve weeks ago, Farnamwood, the site upon which the project is being carried out, was nothing but a vacant farm. Today, more than two dozen houses, in various stages of completion, dot the landscape, and one has already been sold. It was bought by the town building inspector. This speaks much for the quality of the work.

One must certainly admit that to attempt

Lumber is cut to length on the job and door and window frames made by the use of regular woodworking machinery

such a program in the town of Flint required considerable courage, to say the least. Public opinion is a fickle thing, and for a time the popularity of the Spanish type bungalow outside its natural environment was in doubt, but the idea seems to have taken hold.

To the prospective home owners of Flint, this style of house is a novelty but, although the project has been under way for only 12 weeks, it is the talk of the town, and the crowds of interested visitors to the site

This building is being erected on a home site to be used as a temporary warehouse. Later the walls will be punched for doors and windows and it will become a regular house

is a good indication of the success of the development.

In the first place the location is ideal. It is high, well drained, wooded in spots, and lies directly across the road from a golf course which is part of the grounds of the Flint Country Club. A fact which will go far to promote sales is that the new plants of the Flint and the Star Motor companies form one boundary of the property. Thus, Farnamwood, the section across from the country club, where the more expensive houses will be built, affords a convenient residence location for the officials and the salaried men employed at the motor works, while Dixieland, that part of the plot adjacent to the shops, will be developed with small cottages to appeal to the laborers engaged at the plant and to others seeking a low-priced home. The two sections are separated by the Pere Marquette Railroad which runs through the property.

The entire project is being developed along unusual lines. The Central Construction Company furnishes all the materials, but the labor is contracted for by local contractors. The advantage of this is as follows: the company, through its well-established reputation, is able to buy large quantities of materials and therefore effect a saving in cost through quantity purchasing. Labor, however, is generally the same price no matter who the purchaser may be or in what quantities it is bought. Therefore, by contracting for labor, the company has little to lose, as the contractor's profit on the workmen employed is well worth the troublesome detail of dealing with labor direct.

All material is delivered to a siding at the motor company's yard and is hauled by team and truck directly to the site where it is to be used. Any surplus is brought to a central material yard where it is stored until needed. Rough lumber is placed in piles, according to size and length, but all moldings and other materials which might be damaged by exposure to the elements are kept in a frame storage shed. This storage shed also houses a woodworking machine which is used to cut lumber to length and to make door and window frames.

A house is built on every fourth or fifth lot. This automatically increases the value of the vacant lots as well as the improved property and returns the builder an acceptable additional profit on his investment. This photograph shows only a small part of twelve weeks' work

See pages 50 and 51 of the National Builder "Style Sheet" for the basic plans from which these two bungalows were built

Combustible materials, such as paints, oils, etc., and valuable items, such as hardware and electrical supplies, will be kept in a fireproof warehouse which is now under construction. This warehouse, which contains only one entrance doorway and no windows, is being constructed of hollow tile, on a building site. After it has served its purpose as a warehouse, holes will be punched in the walls to provide window and door openings, partitions will be built, and it will be converted into a house.

There are over 1000 building lots in the plot, but since the intention is not to develop each plot, houses are to be built on every fourth or fifth lot. Thus, instead of giving the plot the appearance of being developed only in a certain section, it appears to be completely built up. As a general rule, real estate values increase in proportion to the amount of building. Therefore, by building on every fourth or fifth lot, the value of the adjacent lots is increased to a considerable extent and they may be sold at a profit. The Central Construction Company does not own every lot in the plot. It does, however, have title to each lot upon which a house is being constructed and carries options on some of the adjacent lots, which can be closed and the lots sold at such a time as the construction activities have caused the lots to increase in value to a point where they may be sold at a profit.

The houses which are, for the most part, of the one-story, Spanish bungalow type, so popular in Florida and California, are built on the same floor plan but with several variations in exterior design. Considerable variety is also being introduced by using different colored stucco finishes. Exterior woodwork is painted in gay color combinations, such as blue and orange or orange and black, and this, together with the colored stucco and gayly striped awnings, presents a truly striking picture. Future building, on the lots which are to be sold and improved by the individual owners, will, of course, be restricted so that the high standard of the present development will be maintained.

It would seem that, aside from making a profit, the Central Construction Company is actually doing good work in erecting well-built and beautifully designed homes. Not only are they building good houses but also they are selling them at surprisingly low prices. The average price of a one-story bungalow is less than $8000, including the lot.

It may be said in passing that the Central Construction Company is no new hand at this sort of construction. They have put across similar developments at Seabreeze, Florida, and Villa Park, Illinois, and this past experience undoubtedly accounts in a good measure for the excellent manner in which the Flint project is being brought to a successful conclusion. Applications have been made for copyright on the house designs shown.

The development is being financed by C. C. Heisen, of Chicago, Illinois, and G. P. Morgan is superintendent of construction for the company. C. S. Richardson is in charge of design and decoration.

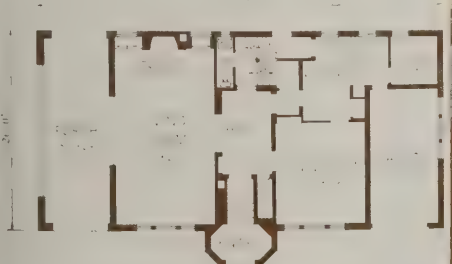
Bungalows of Spanish type, such as the Central Construction Company have built and sold in large numbers in Seabreeze, Florida, are also being built in their Flint, Michigan, project. See pages 50 and 51 for the basic plan from which most of their houses are built

National Builder STYLE SHEET

A Symmetrical Design with Distinctive Details and a Commodious Plan

THIS is the home of Mr. Judson H. Fetters, contractor and builder, in Berwyn, Illinois. It was designed and planned by Mr. James Roy Allen, architect, Chicago. The house is of distinctive appearance with its white plaster walls with the blinds and other woodwork painted green and with a green asphalt shingle roof. An interesting detail is the front entrance which is very attractively enclosed. You go up four steps to the hall; thus has it been possible to give the house that low-lying effect which is necessary in the well-designed home, but at the same time the first floor is somewhat off the street level.

The garage is under the main roof of the house and is, of course, easily heated. Over it is the sleeping porch, whose sides are enclosed by louvres, permitting privacy but leaving the sides entirely open. There is a downstairs toilet directly accessible from the grade entrance in the rear as well as from the main hall. One of the five bedrooms upstairs has its own lavatory. The gables over the bedrooms allow for ventilation of the attic space, so that the second floor will be cool in summer.



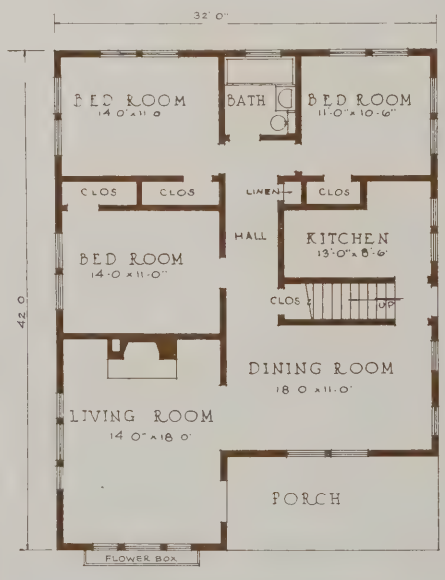
First Floor Plan

Detail of Entry

Second Floor Plan

All These Houses Were Built from the Same Basic Floor Plans.
See Pages 46 to 48

THE work of the Central Construction Company, in Flint, Michigan, is described on pages 46 to 48. Here are photographs of the type of houses which that organization is building in that city, though these pictures were taken of houses in their development in Seabreeze, Florida, and are typical of the Spanish bungalows which are everywhere growing in popularity.



Typical First Floor Plan

An interesting phase of the Central Construction Company's work, as described in the article, is the fact that most of the houses, whether they be of one or two stories, are built from the same basic floor plan. Openings are placed in different positions and in some cases room partitions are changed so as to permit a variation in the layouts. In the case of two-story houses, two extra bedrooms and a bath are added for the second floor. The basic plan is of six rooms on one floor, three of these being bedrooms, enough to accommodate a medium sized family. The rooms are unusually large and so situated that all but one chamber and the kitchen have cross-corner ventilation.

Note the wings on the sides of the bungalows, and particularly the wooden gates. These gates are made in the form of the initial of the owner when possible, and thereby give the house a distinctive touch which the buyer appreciates.

Typical Second Floor Plan

The walls shutting off the back lot are treated like the walls of the house itself

Spanish tile are appropriately used in most of these houses to carry out the architectural style

Here the chimney is in the front of the house and there is no porch

A Half Timber House in Brick, in Pelham, New York

HERE is a house that fits most appropriately into its surroundings. The rough treatment of the brick and the half-timber work suggests the wooded lot and the play of lights and shadows. Lewis Bowman, Mt. Vernon, New York, was the architect.

The house has, to a remarkable degree, the appearance of an old English cottage, yet the plan incorporates such modern features as a sun room and sleeping porch. The entrance is built out from the main wall of the house, providing a vestibule with a closet for coats. The living room is well proportioned. The dining room is separated from the kitchen by the rear entry.

The one stairway is accessible from both the living room and the kitchen and takes up very little space. Note the cross ventilation of the kitchen and the large closet for extra table leaves, brooms, etc.

Upstairs the owner's room is supplemented by a sleeping porch with exposure on three sides, and this bedroom has three closets. The other two bedrooms have cross-corner ventilation.

Because of the steep roof a fourth bedroom and a bath can be finished in the attic if desired.

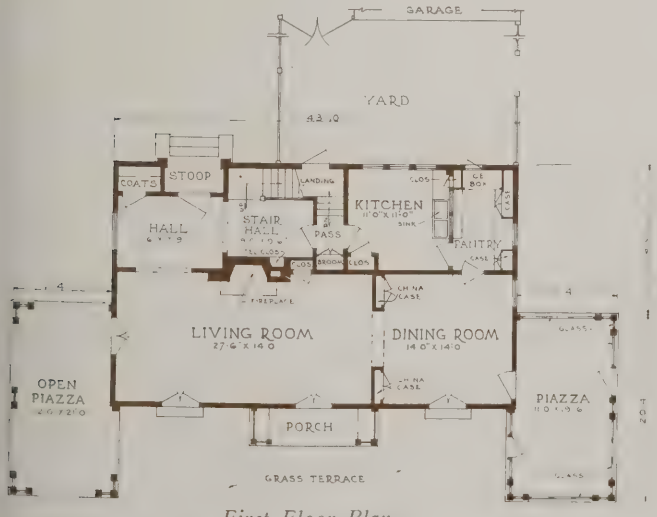
First Floor Plan

Second Floor Plan

Attic Plan

A Wide Overhanging Cornice Tastefully Treated

THERE are some people who like the appearance of the house with the wide overhanging roof. There is no reason why these clients can not have what they want, for when the overhang is as tastefully treated as it is in this house in Wakefield, Massachusetts, which is the home of and was designed by Harland A. Perkins, architect, of Boston, the result is indeed successful. But in addition to an attractive roof, this house is also well proportioned, its openings nicely spaced and the piazzas at the corners skilfully provided with hip roofs that harmonize well with the roof of the house itself. The house sets low on the ground and the wide French doors in the living and dining rooms open directly upon the garden. Notice the little balcony off the sleeping porch upstairs. There are two baths for the four bedrooms, a very desirable feature in a house of this size.



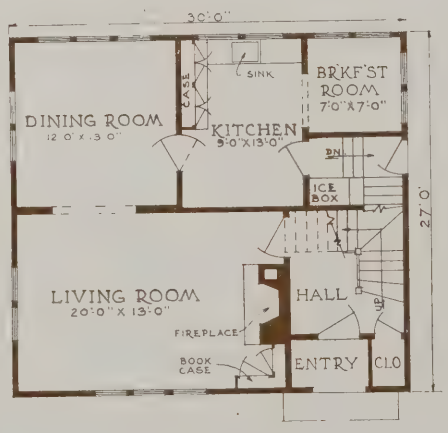
First Floor Plan

Second Floor Plan

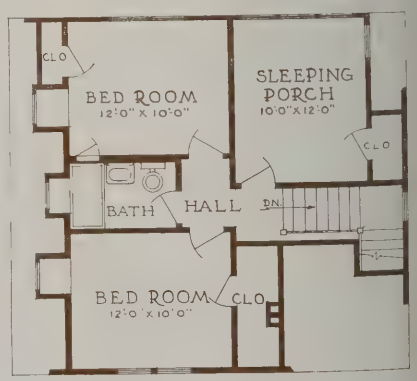
A Simple But Attractive Small House of Six Rooms

A PRACTICE noticeable everywhere is that of snubbing the gables on many gable roofed houses. This sort of thing must be done with caution, else the design of the house may be ruined, and it often is. Sometimes, however, the snubbed gable is very effective, as for example, in this little house designed by W. L. Kraenert, architect, Des Moines Iowa, for Mr. H. W. Crawford, also of that city. It is one of the principal architectural features of the design, for otherwise the house is quite simple, to which it owes much of its attractiveness. The doorway is an interesting detail, because of the arch and of the little "eyebrow" over the entrance. The house is of wood with wide siding painted white and green blinds on the windows for contrast. The foundation is marked by a soldier course of bricks, an effective treatment when the house is set close to the ground as here.

The house is almost square but does not appear so from the exterior. It has a great deal more character than the ordinary square type house.



First Floor Plan



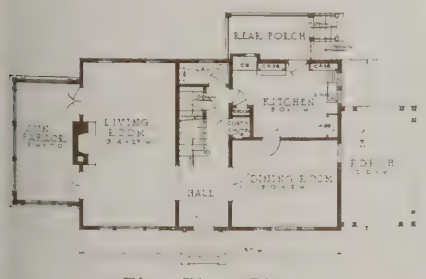
Second Floor Plan

A "Dutch Colonial" House with Sun Parlor and Porch

THE original Dutch Colonial house knew neither the sun parlor or porch. These are modern additions and often they do not add to the appearance of the gambrel roof house when they are placed at the ends, as they are in this case. Here, however, they look as though they belong to the design and they contribute materially to the attractiveness as well as the livableness of this little six-room house, the home of Dr. E. Frankowsky, Oak Park, Illinois. The architects were Foltz and Brand, Chicago, and Mr. J. L. S. Bernard was the contractor.

The house is of yellowish stucco with ivory trim and a green asphalt shingle roof. The blinds are painted green.

The plan is of the central hall type with a living room on one side and dining room and kitchen on the other. There is a downstairs lavatory and toilet underneath the stairway. The basement is directly accessible from the main hall as well as from the outside stairway. The bedrooms and hall upstairs have big closets.



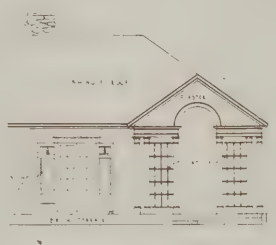
First Floor Plan

View from Garden

Second Floor Plan

A Colonial Bungalow in Fargo, North Dakota

PROBABLY there isn't any such thing as a Colonial bungalow, if by "bungalow" is meant the type of house with wide, heavy roof, big brackets, thick porch posts, and other large details. But if by a bungalow is meant just a one-story house, then this design should qualify, even though it is Colonial in character and different from the common one-story house. This house is in Fargo, North Dakota, and is the home of Mr. J. C. Vincent. Carl A. Gage, of Minneapolis, was the architect. The architect's original drawings provided for an open lattice porch in place of the sun parlor shown on the plans and in the photograph.



You do not enter directly into the living room but first there is an open terrace and then a little porch over the front doorway which leads into an entry and then into a hall. Here there is a closet for coats and access to the bedroom and hall as well as the living room. The living portion of the bungalow is distinctly separate from the sleeping portion and there is a breakfast alcove between the dining room and kitchen. The front bedroom has a dressing alcove with built-in wardrobe and a direct opening to the bathroom. Notice where the tub is placed in this bath and how the second bedroom has its own toilet and lavatory.

Floor Plan

Detail of Entrance

Attractive Papering

By Edward Stratton Holloway
Author of "The Practical Book of Furnishing the Small House and Apartment"

THE proper treatment of walls is the basis of all good decoration. Furniture and abrics may be of the greatest desirability, ut if they are displayed against an inapropriate, discordant background the result an never be pleasing. Special care is needed ı the small house or apartment, where there ; no spaciousness to exercise its neutralizıg qualities, yet the builder is too often areless in this most important respect and mploys any papering that may be handy nd cheap.

The advantages of wall-paper are its reaonable cost and general availability—it is lso the wall-finish expected by the usual enant. Not quite so sanitary as the washble painted wall, nor so permanent, it is evertheless a very satisfactory and atractive surface. Naturally a number of oats should not be allowed to accumulate ithout scraping.

The Desirable Result

In order to preserve proper balance, walls hould be lighter than floors. Light papers lso promote cheerfulness and charm. Nor, contrary to the usual opinion, are they less durable; with proper carefulness on the part of the occupants they remain fresh in appearance, whereas dark papers soon grow dingy and depressing. Darkness also lessens the apparent size of the room—a matter of much moment nowadays when too much space is saved for either appearance or comfort.

The outstanding advantage of the plain wall of pulp or felt paper is that even the tasteless tenant can hardly go far wrong, inasmuch as it is sure to agree with any furnishing. It has been much used of recent years, so that many are seeking relief from its sameness, but it is always good. Nevertheless, the builder who wishes to sell his house may wish its interior to exercise a greater, or at least more noticeable, attraction.

On the other hand the decidedly ornamental wall requires much discrimination in its use. Those who possess knowledge and taste will be able to harmonize even strong decorative elements, but this needs careful planning in connection with the furniture to be used. As the builder has no knowledge of what this will be, he will show wisdom in avoiding papering that will cause difficulty and dissatisfaction.

It is plain, then, that the most desirable papering for small premises is that which is unobtrusive enough to lie back in place and form a good background for furniture and such pictures as are used, while yet possessing decorative quality and character. This decorative quality had better exist in good and not too prominent pattern rather than in force or color, for the latter may badly clash with the fabrics introduced by the future owner or tenant.

Consistency of Treatment

It is readily seen that if small premises are cut up with a variety of paperings all restfulness will be destroyed. Many of the best houses and apartments are papered throughout with the same paper. Yet it is possible to introduce *some* appropriate change without destroying unity of effect. The living-room that has also to serve for the reception of guests may well be rather more

Fig. 1—Lincrusta Walton panel-ing with wallpaper inserts

Fig. 2—A scenic paper above a wainscot is appropriate in the Colonial or post-Colonial house where furniture of the same periods is to be employed

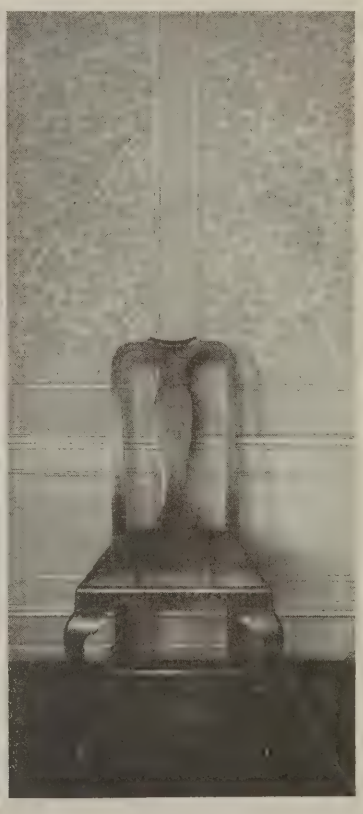


Fig. 3—Lincrusta Walton panel-ing with wallpaper inserts

Fig. 4—A breakfast room or woman's sewing room might be made quite gay with such a paper as this. About one-fourth actual size

expensive and elaborate in treatment than the remaining rooms, or a paper may be employed on the second floor of a house different from that used on the first, always providing that there is similarity in the general coloring. For the sake of relief and novelty a breakfast-room or woman's sewing-room might be made quite gay with such a paper as that shown in Fig. 4. A child's room may also have such a neat little design with figures as illustrated in Fig. 5, but it is questionable whether these things do not grow tiresome and whether other bedroom styles are not quite as attractive.

In all the above exceptions if the ground of the paper approaches in color and intensity that of the wall-covering used throughout the remainder of the house the sense of unity will be sufficiently preserved.

Referring to the illustrations of interiors, Figs. 1 and 3 show very attractive paneled treatments for the better class of small house and apartment. When desired the paneling may be confined to the public rooms, the paper alone being used on the bedrooms.

Fig. 2 illustrates a scenic paper above a wainscot. This style is appropriate in the Colonial or post-Colonial house where furniture of the same periods is to be employed.

Papers for Universal Use

It will be advisable first to mention paperings that may be used throughout the entire premises.

Among the best of these are the stripes, as they have style and a quiet elegance. The alternate satin and plain stripes are too well known to need illustration, and they are always excellent. For small premises those with stripes of from one inch to two inches are best. There is also a very narrow stripe

Fig. 5—A child's room may have a neat little design with figures as in this wall paper. About one-fourth actual size

of cream and gray that is entirely satisfactory. The writer has used both of these and they never grow tiresome.

Rather more elaborate are the stripes with alternates of brocade or figured design often wider than the plain stripes. These may be used throughout where the ornamental stripe is conventional. It may indeed be taken as an axiom that the paperings for

Fig. 6—A two-tone paper obtainable in pale gray, buff, stone color and gray blue

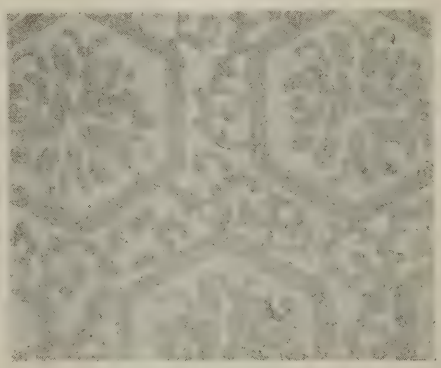


Fig. 7—A paper with a slightly roughish surface and of buff color

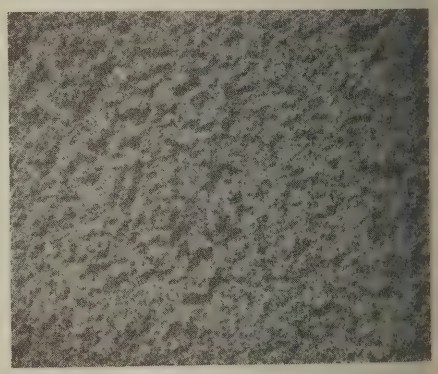


Fig. 8—A paper giving the appearance of rough plaster

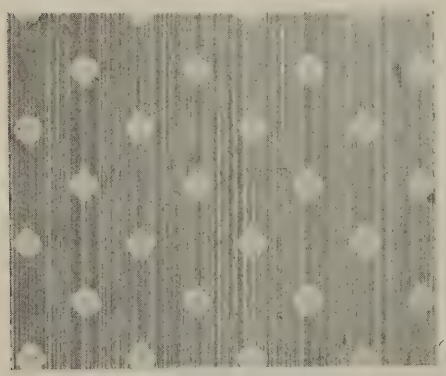


Fig. 9—This dotted design is obtainable in gray with white dots, buff with a deeper buff, gray with pinkish red, and buff with quiet blue

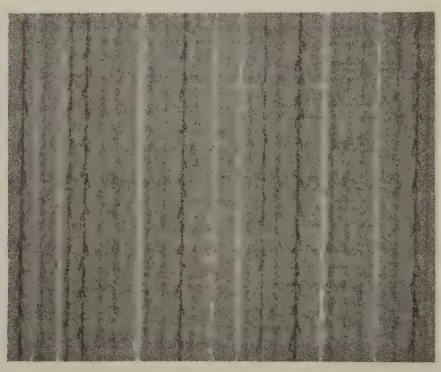


Fig. 10—Canvas effect with an irregular stripe in bluish and reddish tones on either gray or buff background

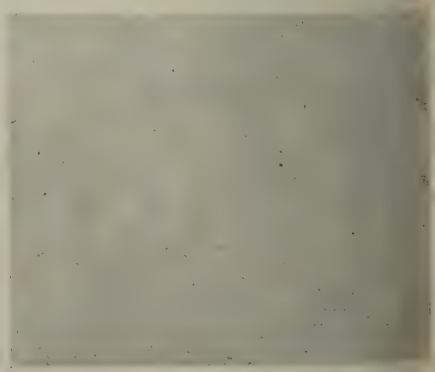


Fig. 11—A small conventional flower pattern of exceedingly quiet buff tint

(Figs. 6 to 13 inclusive are about three-fifths actual size)

Fig. 12—A two-tone paper appropriate for general use in the small house or apartment

the more public rooms should be of dignified, conventional character and that for such rooms fancy, irregular and beflowered designs should be avoided..

Among two-tone and raised effects there are many papers appropriate for general use. Two of the best of these are shown in Figs. 12 and 6. The latter is provided in four shades—pale gray, buff, stone-color and gray-blue. Another fine paper, in buff and with a slightly roughish surface, is illustrated by Fig. 7.

The papers giving the appearance of rough plaster are excellent for this purpose and have more "character" than the pulps and felts. Two of these are shown in Figs. 8 and 13. The latter paper was photographed directly from a rough plaster wall and so preserves the authentic spirit while having the advantage of a nearly smooth, non-dust-catching surface.

Fig. 14 is a rough surfaced paper and Fig. 15 a flock of Adamesque design. Both of these are good for public rooms, though neither should be used for those that are too small, owing to the size of the patterns. There are smaller designs of similar character, and when these are also unobstrusive, by reason of the closeness of their two shades of coloring, they are appropriate for universal use. All of the above mentioned papers are in such neutral tints as various grays, buffs and stone.

Fig. 14—A rough surfaced paper usable in medium sized rooms because of the large size of the pattern. Reduced about one-fourth

Where plain or comparatively unobtrusive papers are employed it is an excellent plan to set down the picture-rail say 14 inches from the ceiling (the paper continuing above it). This is not only much more convenient for the hanging of pictures, but it gives a finish to the wall.

Ceilings should be a lighter tint of the wall covering. It is decidedly better to avoid borders. A rather novel effect may be obtained by the use of a black or mahogany picture-rail with a cornice molding of the same coloring and of about the same width. Canopies may be used where the ceilings are very high; wainscots have a similar lowering effect.

Bedroom Papers

Where these differ from those used in the downstairs rooms it is always advisable to choose designs carrying a sense of neatness and charm.

The dotted paper illustrated by Fig. 9 is provided in four combinations—gray with white dots, buff with a deeper buff, gray and quiet pinkish red and buff with quiet blue. The market supplies many other excellent small designs of like general character.

Fig. 10 shows a paper of canvas effect with an irregular stripe. It is provided in both gray and buff with stripes, in each case of slightly bluish and reddish tones.

Sprawling flowered designs are to be avoided, but Fig. 11 illustrates a small ,conventional flower-pattern of exceedingly quiet buff tint that is most attractive.

The cost of good wall-paper has increased during the last few years, as has everything else, but it is well to realize that it is still very small considering the decorative result

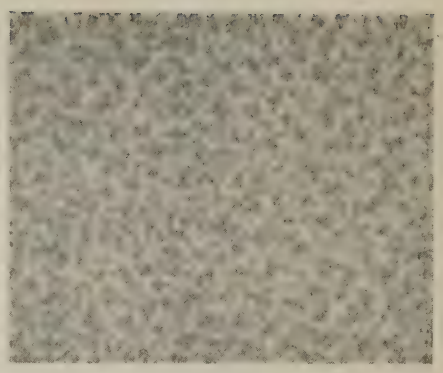


Fig. 13—This design was photographed directly from a rough plaster wall

secured by its use. A little liberality in expense here will bring abundant return at the sale of the house.

(The photographs of interiors illustrating this article are used by the courtesy of The Robert Graves Company, Philadelphia, and the wall paper samples are reproduced with the permission of M. H. Birge & Sons Company, Philadelphia.—Editor.)

Clay

CLAY available for the manufacture of clay products is widely distributed in the United States, and there are clay-working plants in every state in the Union. The general increase in prosperity in 1922 had a marked effect on the clay-mining industry, the clay sold increasing 52 per cent in quantity and 38 per cent in value compared with 1921. Fire clay, which constitutes the largest volume of the clay sold, being 63 per cent of the total in 1922, showed the largest increase in quantity and value.—*U. S. Geological Survey.*

Fig. 15—The Adamesque figure is in relief and of a rough finish in contrast to the smoother and darker background. About one-half actual size

"We Always Manage to Have Something on Hand"

And Here, Mr. L. E. Brickell, of the Brickell Construction Company, Watertown, South Dakota, Tells How—and Why

By Roy M. Singer
Construction Editor

L. E. Brickell, of the Brickell Construction Company

I ARRIVED in Watertown on a Tuesday morning. Now, thought I, I'll drop around to the contractors here and find out what's doing. It didn't take long, for there wasn't much going on.

I went into the First National Bank and talked with the officials, and here was the gist of their reply: "Watertown is located in a wheat-growing country; last year's crop was a failure and that accounts for the lack of present activity."

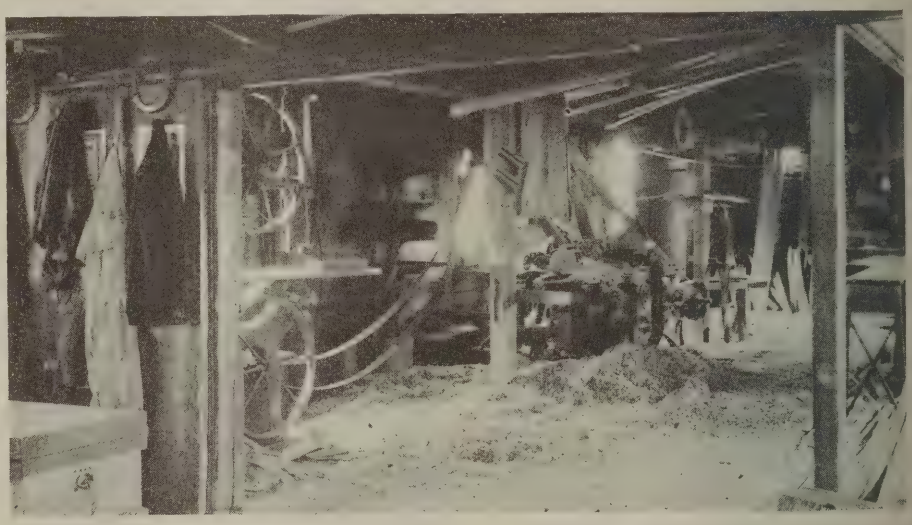
"But what are the builders of Watertown doing to keep alive?" I questioned. "Ask Mr. Brickell," they said; "he's a contractor, maybe he can tell you."

So I did. "Well," said he, after I explained who I was, "it's like this. Watertown is only a town of about nine thousand population and in times like this, when a bad crop hits the vicinity, things are pretty flat. But," he continued, "that is no reason why we should sit around and wait for a good crop to boost business. There are other localities where business is going along at a normal pace and when we strike a depression we look for work outside of Watertown. Besides that, our organization is flexible. We can build anything from a cottage to a bank. We must, or else we would be mighty hard put to keep alive."

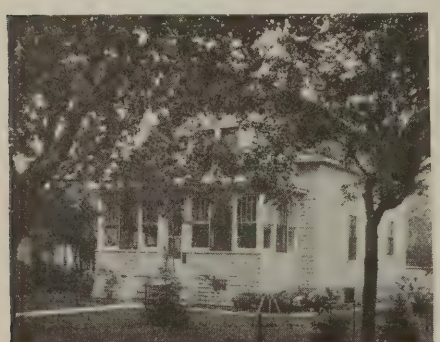
"How about your men?" I asked; "how do you hold your organization in the short no-work periods?" "We keep our foremen," he replied, "and such men as have been with us for a long time; the rest we are forced to lay off. We can keep a few men busy in the shop all the time, laying up surplus stocks of standard items and when the time comes to get organized again we have only to build on our skeleton and we can get under way in great shape. A contractor's life in this part of the country is no cinch, but *we always manage to have something on hand.*"

I agreed with Mr. Brickell. A contractor's life in a small town, which depends for its prosperity on the wheat crop, is certainly no bed of roses. It means hard work and plenty of it. It takes a man with nerve to make such a business go. Ordinarily it is a continuous struggle for existence. But Mr. Brickell has found a way out by always managing to have something on hand. How about you?

Office and personnel of the Brickell Construction Company



Interior of the shop, where men are kept busy during dull periods



The Brickell organization is flexible. They build anything from a cottage to a bank

Paint as an Aid to Renting and Selling

Selecting Colors for Interiors

By Albert Brace

THE companion article to this one, dealing with color combinations for exteriors, appeared in the September issue and everything said therein respecting their effect on the prospective purchaser applies with equal if not greater force to interiors. For, as pointed out therein, neighbors may be the chief sufferers from a bad selection of outside paint colors, but inside the owner or renter is faced with having any faulty choice directly before him 365 days out of the year. His, or more usually her, favorable impression at the outset is therefore of the first importance.

Before going into this subject in detail, however, let the writer point out that he is first and foremost a paint man and the suggestions presented as to interior coloring values will have their basis in the fundamentals taught by his trade. For the viewpoint of the experienced interior decorator translated into terms of practical value to the builder, the reader cannot do better than peruse closely the contribution of Mr. Edward Stratton Holloway on pages 57-59 of the October issue.

Paint in the forms adapted to interior decoration may be an end to the manufacturer, but to the builder of discernment it is only a means to an end. It is easy enough to pick up a flat wall paint color card and select a pearl gray as just the thing for a dining room, but any number of other builders can and often will select the same shade. Real genius lies in selecting two obvious shades and mixing them together to produce an individual one which will cause the prospective purchaser to say: "Here is a room that's interesting—not just painted to hide the plaster."

As Mr. Holloway points out, the interior treatment of homes built for the open market is apt to be a little too standard in treatment. The houses may sell because there is a current demand, but they won't command a price or start a reputation for the builder. Yet some may object that this requires special training, agreeing with the character in one of Shakespeare's plays who is made to remark: "Painting I have heard say, sir, is a mystery." This is not necessarily true if individual interior effects are the object for a little knowledge of basic values can be supplemented not only by such concrete suggestions as Mr. Holloway's but by following periodicals devoted to the subject and first-hand observations on every possible occasion by the builder himself.

The builder of today no longer caters to a public that is satisfied with florid wall papers, "warm" red living rooms and highly figured imitation oak woodwork. As a nation we have come to the realization that interesting interior decorative effects are not a question solely of money, but much more so of good judgment in the selection of suitable materials and colors. The wall paper arabesques that jangled the nerves and set the eyes to rolling two generations ago have given way to soft tones of calcimine and flat wall paint.

The former is cheap, easy to renew and available in an indefinite variety of tasteful tints; the latter is more durable and easily kept clean with an occasional warm water washing of soiled places. There is no glare, no seams exist to gather up germs in decaying paste, no intricate patterns to torture the gaze, but rather an even restful back ground to enhance rather than to detract from the natural beauty of rugs, furniture, drapes and fixtures.

Since the builder obviously cannot know what furnishings are eventually to find their way into the rooms, his goal should be, so far as coloring is concerned, a pleasant neutrality which at the same time will steer clear of lifelessness—originality minus the bizarre. While certain rooms may be given individual treatment, all must show consonance with a scheme of general harmony. Who, for instance, would enjoy looking from a yellow room to a blue one or a pink one to a brown one? Yet uniformity is not the sole route to safety, for grays melt into blues, creams into light tans naturally and without a jarring effect.

Another consideration is that of natural lighting. A room with a northern exposure where the light is modified is best treated in warm creams, buffs and tans. For a southern exposure with plentiful light, use rather blues, greens, grays and variations such as sand, ecru, putty and champagne. There are two kinds of natural light which enter a room, that which enters the windows direct and that which is reflected from the ceiling. If the direct light is excessive, then the ceiling color should be tinted to make it absorb; if the direct light is deficient, then the ceiling should be white or nearly so in order to reflect all the window light.

While the average house with walls of medium height looks best with the wall color carried to the ceiling, rooms with high ceilings may require a drop ceiling, in which case the part above the molding should be done in light tones. Such variations should be carefully handled so as to avoid any abruptness of change. For instance, buff walls would call for a cream upper ceiling and an ivory white ceiling color. This is particularly important in a high, narrow room, as it appears lower and broader.

Harmony through easy graduations of color is the most natural way of getting variety in decoration—tones of one color keep the whole related. Unconsciously our tastes in this follow nature itself—light ceilings correspond with the pale blue sky fading to white at the horizon, further down more solid wall tones to correspond with trees and hills, at the base subdued floor colors to correspond with valleys, mossy rocks and shadows. So accustomed are we to the tones and colors involved in this scheme that travelers in the arctic and antarctic regions are frequently rendered "snow blind" by the monotonous glare of glittering white about them.

Aside from the power of color to adjust

Subdued richness can be imparted to a dining room such as this by tinting the walls ivory and lining the deep parts of the molding with chrome yellow. Silver gray flat paint and dull blue lining is another good combination

deficiencies in lighting, there is also its ability to change the apparent proportions of a room. Red, being known as an "advancing color," contracts and is therefore suitable with modifications to suit modern tastes for a large room, drawing it together and making it appear smaller and less formal. Tones of buff, yellow, orange and violet are in the same category. Tan, gray, blue and pink are "receding colors" and have the effect of adding space. In a class by themselves are the medium shades of green which have practically no effect in altering the apparent size of a room.

By way of practical example, to improve a room that is small, deficient in natural lighting and has a low ceiling, treat the wall three-quarters of the way up, say to the plate rail or top panel molding, with a soft turquoise green, beyond that with a light buff or cream. In a high ceilinged room that is small but well lighted use a Delft blue (not too deep), or old rose with gray or ivory woodwork. A poorly lighted large room needs something like a buff wall color with white or cream color woodwork to give it life and airiness.

Care should be taken to see that the woodwork harmonizes with the wall treatment. Some of the combinations to be avoided are: mahogany and red; weathered oak and blue; gray enamel or silver; gray oak and tan; brown and olive; yellow enamel or golden oak and pink or light blue. Cream and ivory enamel harmonize with practically every wall tint and green is really bad only with light blue.

Since in entering the new home one's first impression is gained from the hall, its color treatment should be carefully considered. Too dark a color will absorb so much light as to give an impression of gloom, of "feeling one's way about;" too light a color will seem cold or form too great a contrast with the rooms adjoining. Much depends, of course, on the style of the house—a dark stain would be appropriate to a rustic bungalow or chalet; white enamel with relief from mahogany trim will always be a consistent Colonial scheme. An undecided style calls for medium tints of cream, ivory, soft green or gray. Where the abutting rooms are done in individually characteristic color treatments a deft compromise for the hall is to stipple it in combinations of these colors, thus forming a perfect introduction for all.

To attain that economy of space which is the modern heritage of high land values and scarce servants, present day homes, even of the better class, usually combine the drawing room and living room into one. The resultant compromise has taken on something of the formality of the former and the cozy intimacy of the latter—and both are expressed in the paint treatment. Gilt or other seldom used drawing room furniture customarily had a wall tint background of light blue, canary or pink—the living room, often known as the library, ran to russet and leather browns, dark blues, greens and even reds. Between these extremes lies the variety favored by current taste—dignity and informality being happily blended.

If the room is paneled and large, ivory or cream enamel is probably the most effective, but if it is average in size and proportions, the safest color to harmonize successfully with almost any furnishings is putty. Also expressed in terms of Bedford stone, caen stone, gray-brown and neutral gray, this blend seems to have in it a little of all colors—in any case it offends none and is yet sufficiently full of character to avoid being flat and meaningless. It sets off period furniture particularly well, notably the Renaissance styles now so popular with their soft, mellow non-glossy finish.

An excellent example of the restful quality of a wall stippled in light effects, such as gray on white, pale blue on gray, light brown on ivory, etc.

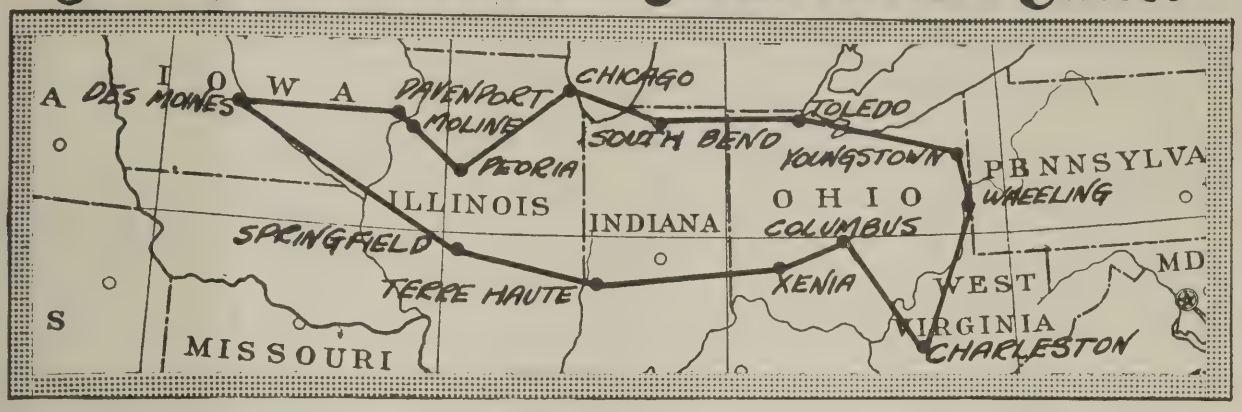
For safety with a little more life the stippled or Tiffany glaze effects offer an excellent compromise, especially where carried out in very light tones: gray on white, pale blue on gray, brown or blue on ivory—never blue on red, orange on yellow or brown on pink. Gray, it may be said in passing, is like green, a very difficult color to handle on walls—on small chips both may look very attractive, but transposed on too large wall areas the former may easily become steely, cold and military and the latter bright, sharp and unrestful. There are numbers of good gray tones, but these in point of fact are apt to be rather greens, blues, lavendars and browns skillfully tinted.

Libraries, dens, billiard rooms and studies are essentially masculine retreats and should indicate the fact by being treated in sombre tones, the male fearing that anything light may be construed as smacking of a boudoir. Therefore deep browns, greens and dull reds have the call with upper side walls in buffs, light tans and ivories. If a prospective buyer or renter sees these combinations in any room not obviously intended for another purpose he will mentally seize upon it as his own; do it in pink, ivory or light blue and he will have no personal interest in it —it is part of the psychology of color.

In former times the dining room was equipped with heavy furniture and studiously wrapped in gloom. Today, in addition to a less formal attitude toward the function of eating, it has been discovered that dark furniture looks best against contrasting light walls, especially if the room is small. Hence dining rooms are now treated very much as living rooms—ivory and cream enamel on paneled walls, the same shades in calcimine and flat wall paint or plain ones; for variety there may be added buffs, pale grays and light stippled effects. The dining room, as with everything else in this day of sanitation, must look clean and immaculate, not stuffy and "impressive." That cleanliness and good cheer have a better place would be difficult to deny.

The keynote to be struck in selecting the color for a bedroom is simplicity. It must be cheerful in the morning when we arise refreshed, restful in the evening when we retire weary. Therefore a simple one-color scheme is best—ivory, warm gray, putty, pale lavender or pink (no stippled, stenciled or Tiffany effects), preferably in flat wall paint since it is both lustreless and washable. In the nursery pink, straw and cream offer a good selection, the medium being calcimine since it can readily be washed off and done over in case of damage. Bathrooms by custom are white enamel, although there is an increasing tendency to court variety where the lower half of the wall is glossy white tile by enameling the remainder light blue or ivory. Much the same is true of kitchens—white, though sanitary, is not necessarily cheerful, hence pale green, blue and cream offer distinctive advantages.

On the Job with the Construction Editor



This map shows the ground that Singer is covering on a trip at the present time

WERE you ever in Hartford or New Haven, Connecticut? Have you seen recent buildings in Des Moines, Iowa, or Detroit, Michigan? Do you know any builders in Manchester, New Hampshire, or Rutland, Vermont? Do you use any of the short-cuts and time-savers that builders in White Plains, Mount Vernon, and Binghamton, New York, are using in their construction work?

Probably not. But would you not like to visit these points and see builders in these towns and what they are doing to do more and better work at less cost?

Every builder who is really interested in getting ahead would have the time of his life visiting other builders in these localities, yet that is absolutely impossibe for everyone to do. It would cost too much money and it would take up too much time to make so many calls, and if all the over 22,000 subscribers to NATIONAL BUILDER were to call on the contractors in these cities, these contractors could do nothing else but entertain visitors.

NATIONAL BUILDER, this issue, is bringing the builders of all these towns to you instead of asking you to go to them. It is doing this through the medium of the pen and camera of the Construction Editor, Roy M. Singer. Singer in the past few months has visited every one of these localities and has made numerous observations on the work the contractors there are doing, and some of these he passes on to you in the six following pages.

Roy M. Singer, Construction Editor of National Builder, on the job with Harry E. Anderson, a contractor of Moline, Illinois. Some of Mr. Anderson's stunts in building a large church will be described in a forthcoming issue

The above map shows a trip that Singer is making as this is being written, and in future issues you will get the results of his observations on this trip.

You cannot afford to overlook these pages and they deserve your most careful attention, because every one of them contains time, money and labor saving ideas which might be useful to you in your own work.

NATIONAL BUILDER is the only publication for the contractor and builder which is putting before its readers such practical suggestions and helpful information. Take advantage of this service and make the fullest use of this department, and you will consider NATIONAL BUILDER the most helpful influence in your business, as many contractors and builders everywhere are finding it.

On the Job in Connecticut.

Floors Before Foundations

SOMEONE, as soon as he gets the gist of this item, will say that this Hartford contractor has put the cart before the horse, but he will do well to stop and consider whether it hasn't been profitable in this instance. To state the case in a nutshell, this builder set his foundation forms, built his sub-floor, placed his mixer inside the building, and then proceeded to pour the foundation. The ordinary method of procedure is to erect the forms, pour the foundation and then build the floor.

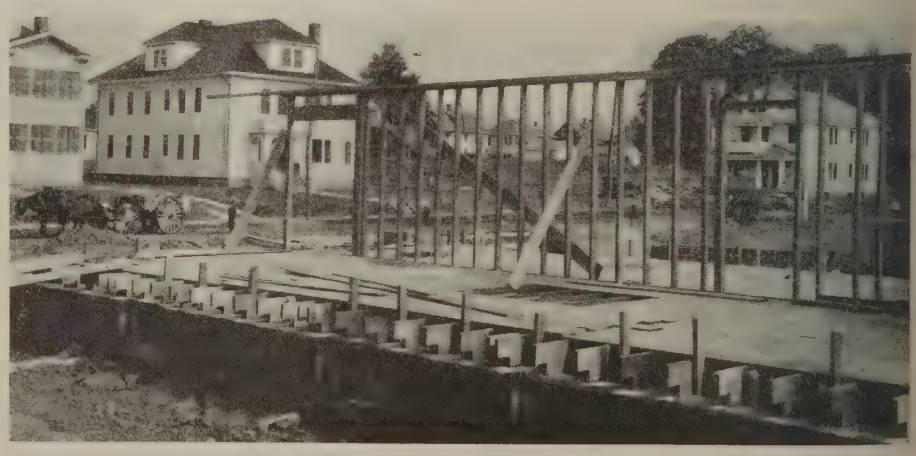
Now, then, just what has this man gained by his novel way of doing things, or what has he lost? Let's investigate.

This view shows the forms and floors in place before pouring. The mixer is placed so that the dry materials can be dumped into it as soon as they are brought up the inclined runway shown at the right of the picture. Notice that the form studs are carried above the floor to provide a bumper for the concrete buggy

For one thing, he would have to set the floor some time or other, so what's the difference if he sets it before the foundation is in or after? It means first, that the formwork must be made stronger than ordinarily, and braced stiffer than usual in order to support the floor and carry the mixer while the foundation is being poured. Secondly, a bit more than ordinary care is required when pouring the concrete due to the fact that the forms are partially blocked by the joists.

On the other hand, instead of wheeling dry materials to the mixer in small wheelbarrows and then wheeling the mixed concrete to the forms in small wheelbarrows, the dry materials are carried to the mixer in wheelbarrows, but the mixed concrete is carried to the forms in buggies which have double the capacity of an ordinary wheelbarrow. Since the buggy is operated on a level surface it is easier for a man to operate than it would be for him to push a wheelbarrow of half the capacity up an inclined runway. Therefore, instead of having the same number of men on both sides of the mixer, one man on the delivery side will handle the material delivered by two men on the receiving side and the wages of one laborer will be saved. Also, no scaffold or runway is necessary since all wheeling is done on the rough floor which forms a more solid runway than any ordinary scaffold.

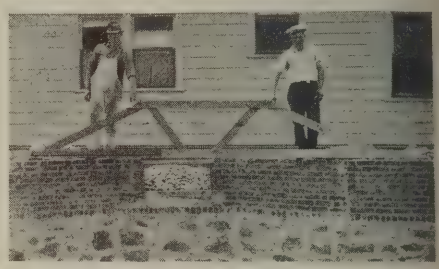
Whether a reduction in cost is possible by this method of construction depends entirely upon whether the extra money spent on the formwork is less than the money saved in delivering the concrete. The idea is worth while thinking about, however, and the writer will be glad to hear from any contractor who tries it as to whether or not it is more profitable than the ordinary method.



This view shows the poured foundation with the outside forms removed. Note provision made for setting sills under joists and note particularly that each joist rests solidly on top of the foundation. The basement window frames were placed before pouring and they are, therefore, securely held in place

An Aid to Building Rubble Bays

SOME masons find trouble in building bays in rubble foundations. Clarence Razzee, a contractor of New Haven, provides his masons with a frame guide as shown in the illustration. This guide not only aids the men in laying up the wall but also it does away with the necessity for providing chalk-line guides at the bay.



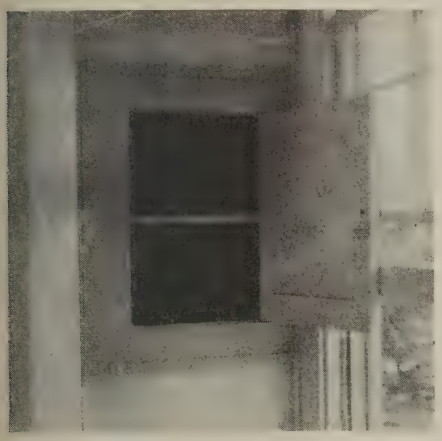
Forms for laying up bays in rubble wall

At first thought this does not sound like much of an idea, but anyone familiar with laying rubble foundations will readily understand the added ease afforded by such a form as this over the old method of working with troublesome chalkline guides. For one thing, the chalkline must be taken down at the end of one day's work and set up again at the beginning of the next. This may not seem much labor, but the next time you lay out a chalk line for an interrupted wall, see how long it takes you to do it.

On the Job in Des Moines, Ia.

Extra Cabinet Space

NOTHING is so useful and necessary around a house as closet and storage space and no builder should overlook an



This cabinet is set in what would be otherwise waste space

opportunity to provide as much space as the plan will allow. No matter how many closets or cupboards a house may contain, it seems as though there are always more required. Plenty of closet space has been the closing argument in the sale of more than one house and wise

The door of the cabinet may be seen through the second-story window

is the builder who knows this and governs himself accordingly. Houses, it has often been said, are always sold to women, and one of the first things a woman wants to know when she examines a house is the size and the location of the available closet room and storage space.

These two illustrations show how F. M. Leach, a builder of Des Moines, Iowa, put an extra cabinet in a bedroom in what would otherwise be waste space. The location was just under a dormer where the wall had been furred out on account of the roof slope. The open door of the cabinet can be seen through the window.

This is a tip that may well be followed by other builders. How about that house you are putting up? Is there a nook or a cranny in which you could place such a cupboard? It won't cost much, but it will be a good talking point.

Temporary Stairway

FINISHED stairways are hardly ever set until the plastering is done, and some temporary stairway is generally erected

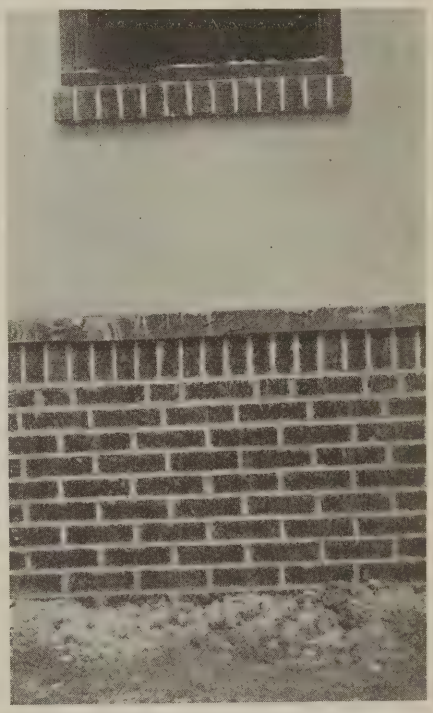
After it has served its purpose this temporary stairway can be moved to another job

to serve the workmen passing from one floor to the other. Sometimes stringers are set and temporary treads set on them and when the time comes for placing the finished stairway the temporary affair is thrown on the scrap heap.

This illustration shows a temporary stairway used by the Commercial Building and Securities Company, builders of Des Moines. The stringers and treads are 2x6 and the treads rest on cleats nailed to the stringers. When the building is ready for interior finishing this temporary stairway is removed as a whole and used on another job instead of being broken up and thrown on the scrap heap. This stairway should serve for several jobs before it is ready for kindling.

To Prevent Stucco Stain on Brick Foundations

WHEN doing stucco work above a brick foundation the little kink shown, which was used on a housing development



This strip, set at the point of division of the stucco and brick, not only acts as a ground for the stucco but also prevents stucco stains on the brick

by a Des Moines contractor, is a good way to prevent the splashing of stucco over the brick base.

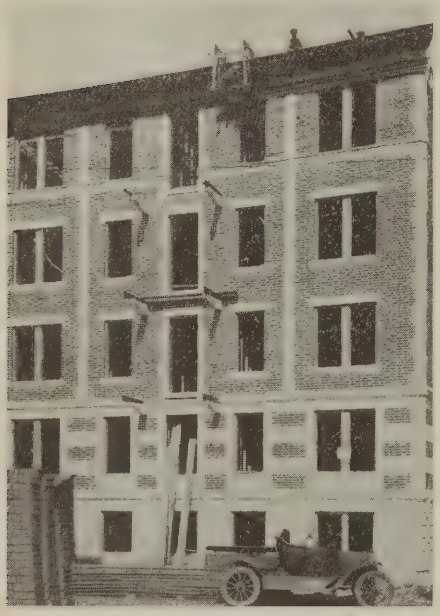
This little stunt consists of nothing more or less than a piece of 1x4 nailed to the brickwork where the stucco line begins. Any stucco falling from the plasterer's trowel will strike the edge of the 1x4 and be deflected away from the brick wall, dripping over the edge of the 1x4 to the ground without touching the brick. Note the stucco lying on the ground at the base of the wall which has dropped while the stuccoing was in progress and note the comparatively clean surface of the brick base.

On the Job in Detroit, Mich.

Sheet Metal Workers' Scaffold

TAKE a look at these fellows hanging over the edge of a four-story building. How would you like their job? You wouldn't perhaps, but someone must do it and these boys were elected.

Even if you don't envy them their job,

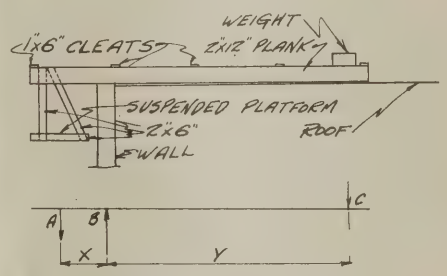


View of scaffold from street

you may be interested to know what kind of a scaffold they use to work upon. It is simply two planks on edge with a hanging seat suspended from one end and a small weight to balance it on the other end. The planks are 2x12 and are about 20 feet long, and the small pieces used to suspend the platform are 2x6. A few 1x6 cleats are nailed across the planks to keep them upright and prevent them from spreading.

It may seem strange that only a small piece of stone coping and a roll of wire furnish enough weight to keep the two planks from tipping end-up and dropping the workman into the street, but a short explanation of the theory of levers will show how this works.

The arrangement shown here may be spoken of as a lever of the first class, or a lever where the fulcrum, or point of support (see B in sketch) is located between the two weights. The theory states that for equilibrium, or balance, the product of the weight and distance from the fulcrum, on one side of the fulcrum, should be equal to the product of the weight and the distance from the fulcrum on the other side. This means that the weight A (see sketch) times the distance X should be equal numerically to the weight C times



Application of lever principle to scaffold

the distance Y, or expressed mathematically,

$$AX = CY$$

By algebra, the formula

$$AX = CY$$

can be made to read

$$C = \frac{AX}{Y}$$

and the weight at C required to balance a man at A is found in the following manner. Suppose the distance X to be 3 feet, the distance Y to be 15 feet and the weight of the man at A, together with his tools and that part of the scaffold which hangs over the walls, to be 300 pounds. Then by substituting these figures for their respective letters in the formula:

$$C = \frac{AX}{Y}$$

The formula becomes:

$$C = \frac{300 \times 3}{15} = \frac{900}{15} = 60$$

Thus 60 pounds will be needed at C to hold 300 pounds at A.

It is not enough to place just exactly the amount required, for this is only enough to hold the arrangement in balance. It is best to double the amount required, thus obtaining a factor of safety of two. An additional factor of safety is provided by the weight of the two planks on the side of the fulcrum opposite the platform since their weight was not taken into account in making the above calculation.

View of scaffold from roof. The man who works on the platform has two helpers

Sewer Tile Elbow for Thimble

THIMBLES for small vent pipes such as flues to carry off odors from gas ranges are generally made from galvanized sheet-metal cylinders, but here is a different one. It is an ordinary sewer tile elbow and where the vent is carried up to the roof in a line of tile, this makes the best possible arrangement for an opening, since the entire vent pipe is continuous instead of a pocket being left at the place where the vent line meets the opening.

Tile thimble in place

This photograph was made on a large apartment job in Detroit, for which Benjamin H. London was the general contractor.

On the Job in Manchester, N.H.

To Save Sheet Piling

SHEET piling is expensive, therefore why waste it? Why drive good timber into the ground and leave it there

Fig. 1—View showing crab attached to stiff-leg

when it may just as well be reclaimed. For the contractor who uses sheet piling, this little tip from the city engineer of

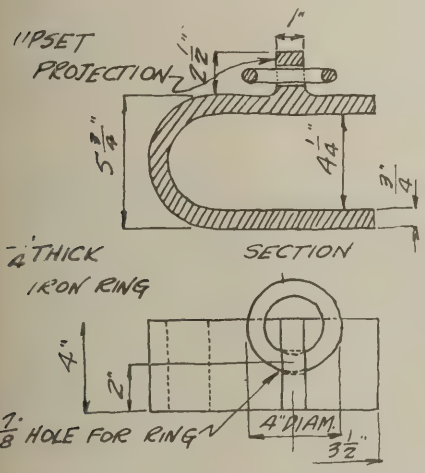


Fig. 2—Sketch of iron collar for 4x6 sheet piling

Manchester may be a money saver. It is a rig for pulling sheet piling after its purpose has been served.

This outfit consists of a small stiff-leg derrick equipped with two blocks with swivel hooks, and a crab. The crab is fastened directly to one of the legs of the derrick. The lower block hooks into an iron collar which can be slipped over the piece of sheet piling, as shown in the sketch. The upward pull of the block serves to hold the collar fast against the piece which is being pulled, and the harder the pull, the tighter the grip of the collar becomes. Where two-inch plank are used for sheet piling this rig may not work,

Fig. 3—View showing hook in collar-ring

for the collar would be apt to break the plank by causing it to bend and snap off, but where 3x4 or 4x6 are driven, this outfit should do the work in great shape.

Notice in Fig. 3 that a workman is swaying a half pulled piece of piling to and fro. This tends to enlarge the hole and make pulling easier.

It is surprising how efficiently this scheme may be operated. The tension in the pulling cable can be increased by using triple blocks instead of double blocks in case it is found that a double block requires too much elbow grease on the winding end of the cable. It must be remembered, however, that increasing the number of tension lines means a decrease in the speed with which the piling may be pulled.

A Portable Platform

ALMOST every builder, sometime or other, has wished for a "sky hook" where he could hang a scaffold for a man to reach some place which was not easily accessible. "Sky hooks" would be great things, but since they belong in the same class with winged horses and self-replenishing pocket books, the best thing we can do is try to buckle down to work and build something to take their place instead of dreaming what we could do with them if they existed.

C. A. Golden, a contractor of Manchester, doesn't spend much time thinking about "sky hooks," but he does put in a few moments in digging up ideas like the one shown here. This is a little portable working platform which may come in quite handy on your own job. In this case it was used to provide a place for the steel worker to stand upon while setting a steel beam. It

Only a small amount of time and material is required to make this portable platform

was not possible to work outside the wall since a building came directly to the lot line. This platform would seem to be much more satisfactory than a ladder, as it provides a workman with a greater degree of freedom.

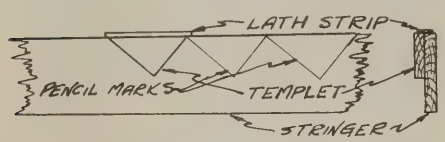
It also gives a man a sense of security he might not otherwise feel when working on a plank or a ladder. This is a factor not to be overlooked.

On the Job in Rutland, Vt.

Templet for Stair Stringers

MEET Mr. W. H. Tarbell of Rutland, the gentleman shown holding a small triangular piece of wood. This piece is a templet for cutting stair stringers and Mr. Tarbell uses it for all work where exactness is not required. This templet is cut true so that it will give the required height of riser and width of tread for a particular stair and it is used to lay out the cuts on the stringer instead of using a square. We all agree that this method is not as accurate as where a square is used, but it saves considerable time. When laying out a stringer for an exterior stair, the little error which may creep in will be hardly enough to give any trouble, whereas the time saved may be considerable.

W. H. Tarbell holding the templet



How templet is used

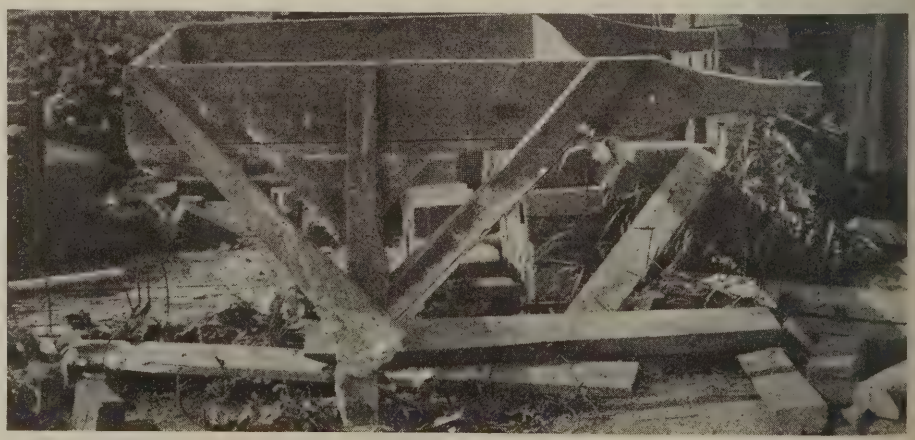
If you look closely you can see a lath nailed on the diagonal side of the templet. This lath extends beyond the face of the templet and provides a means of guiding it along the stringer. When using this little "kink" all you have to do is set the templet on the stringer, run a pencil around the edge to mark the cut and then slide the templet along the edge of the stringer to mark the next cut. This may be "old stuff" to you, but if you don't know about it, it may be worth a trial. The use of this templet is the same, except that it is not so precise, as when an adjustable fence is used in connection with a steel square.

A Tilting Sand Screen

DO you screen your own sand on the job? If so, how do you do it? Do you throw the sand up against an inclined screen, as nearly everyone else does, or have you a little idea of your own?

Take a look at this illustration of the way Bert Bissel, a Rutland, Vermont, contractor does it. He builds a screen box and elevates it on a pair of legs so that it can be tilted. The arrangement is operated by tilting the box back and forth, thus rolling the sand to and fro on the screen. The longer the box, the greater roll will be given the sand. Therefore, the efficiency of the screen will be greater as the length of the box is increased.

But you must bear this in mind. The longer you make the box, the smaller you make the tilting angle, and the smaller you make the tilting angle the less efficient the screening becomes. Of course, the efficiency can be maintained by increasing the height of the leg in the same proportion as the length of the box, but for easy operation the screen should not be brought too high above the ground. If you want the best possible results from this outfit it is unwise to bring the tilting angle below 45 degrees. This means that the distance, when the screen is horizontal, from the ground to the screen should be the same as the distance from the leg to the end of the box.



The screen is operated by tilting it to and fro

Variable Height Scaffold Horse

YOU may be interested to know about this little idea which Frederick C. Ives of Rutland uses. It is a means of providing a scaffold which may be varied in height without the necessity of using different sized horses. The horses shown in the accompanying illustration are slightly over six feet high and the distance from the top of each cross-piece to the top of the next cross-piece is about 16 inches. By sliding planks between the horses and resting them on the different cross-pieces the height of the scaffold can be varied from 16 inches above the ground to over six feet. Notice that the cross-pieces are nailed on only one side of the horse. By so doing it makes it easier to slide the planks through.

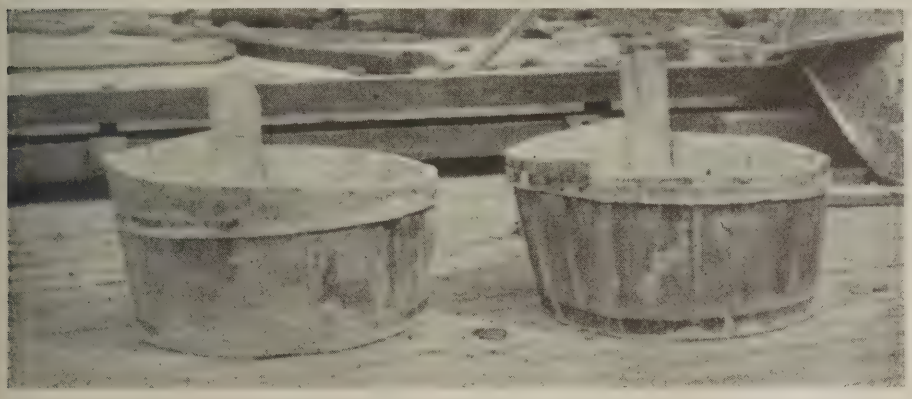
Horses for a variable height scaffold

On the Job in New York.

A Use for Lime Barrels

WHAT do you do with your old lime barrels? Throw 'em away, or use 'em to keep the boiler under the hoisting engine fire-box going?

See what M. Marx, a White Plains contractor, does with his lime barrels after they are emptied. He makes mortar kegs from them. Notice that one stave is cut longer than the rest. This long stave serves as a handle.



These mortar tubs are made from lime barrels

An Ounce of Prevention

WE are all acquainted with the old saw which tells us that an ounce of prevention is worth a pound of cure. This applies to the building industry as well as to anything else. A good builder is unsparing in throwing in "ounces of prevention" on his jobs, even though in some cases these precautions may seem a little bit unnecessary.

Take, for instance, Morris Frudenheim, who was putting up a large store and apartment building in Mt. Vernon.

The floors of this building were carried on wood joists which framed into steel girders. The joists were cut so that they fitted into the space between the flanges of the girder, and the flanges, which were exceptionally wide, furnished sufficient bearing for the joists.

As a precaution against the joists slipping off the flange, due to excessive deflections, sliding along the flange, or any other reason, metal hooks, which fitted over the top flange of the girder, were nailed to every fourth joist. In the large circle is shown one end of a hook and the smaller circle shows the other end bent over the top flange of the girder. These hooks were made of 3/16x1½-inch strap iron and 16d nails were used to hold them to the joists. The nails were clinched on the side of the joists opposite the hooks so as to make a solid job.

Gauge for Setting Grounds

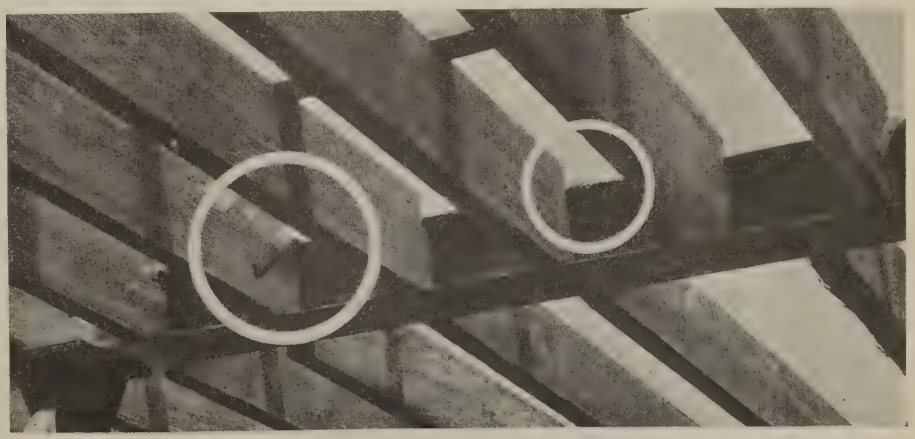
THIS device, which the writer saw in Binghamton on a job of J. L. Weirs, is what is known as a ground gauge. By its use, the spacing of grounds becomes easy and the carpenter is assured that the edge of his ground is perfectly straight all the way down the stud.

The gauge is made of two long pieces of hard wood held together by two cleats, with the inside edges of the long pieces as true as they can be made. Two small blocks are nailed to the cleats in order that the whole arrangement may be kept far enough away from the stud so that the grounds can be brought to bear against the inside edges of the long pieces.

When using this gauge it is set against the stud and one ground placed, using the straight edge of the gauge as a guide.

The gauge in position

Then the other ground is set by being held against the other edge of the gauge. Thus both grounds are perfectly straight and their outside edges are kept apart at the same distance for the entire length of the jamb.



Hooks for holding the joists to the steel beams are shown inside the white circles

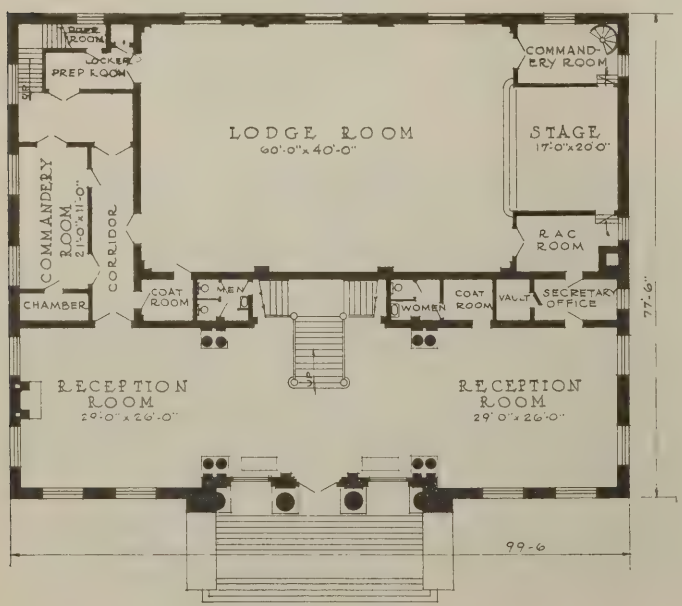
New Masonic Temple in Manhattan, Kansas, of Native Stone

IN many a town and city the Masonic Temple is one of the finest buildings, if not the finest, in town. This certainly is true of Manhattan, Kansas, a municipality of some eight thousand population. Clarence E. Johnson, contractor, of Manhattan, has just finished building for the Masonic lodge of that town a fine new hall which is pictured and described here. W. E. Glover, of Topeka, Kansas, was the architect. This building is typical of the sort of structure that is coming more and more into use and it is in the hope that National Builder can be of some service to its readers in other localities that these photographs and plans are published as suggestions for a medium sized Masonic Temple.

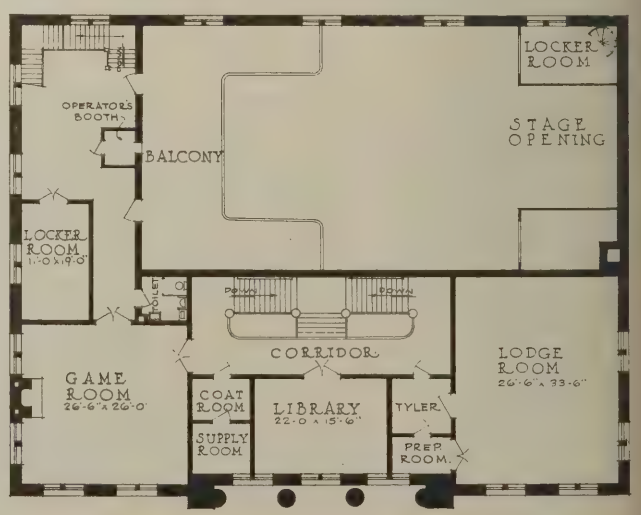
The Masonic Temple is very appropriately built of stone native to Manhattan, with Indiana limestone used as trim. The floors throughout the building are of reinforced concrete. The roof has a steel truss over a concrete ceiling, and this is covered with Spanish tile on all sides, with a deck of composition roofing.

The building is heated by a vacuum steam system and is designed for indirect lighting, which will be installed later.

The first floor plan includes a large and



First floor plan



Second floor plan

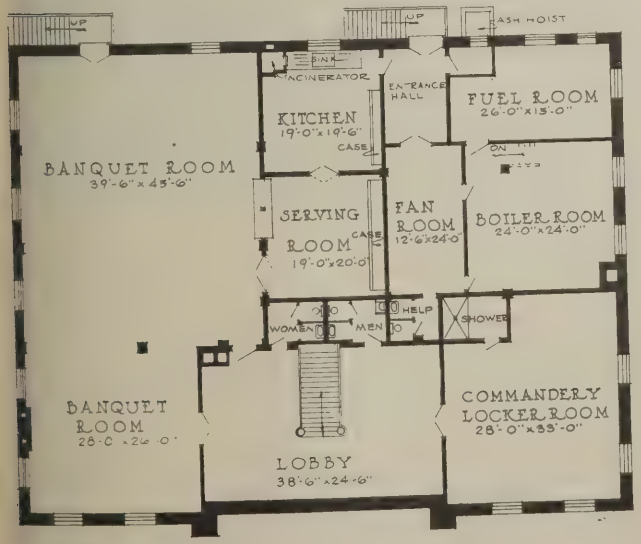
Looking past the stairway to the reception room on the left as you enter the building

attractive lodge room with a stage at one end and commandery and paraphernalia rooms at the sides. The front of the building is occupied by two large reception rooms which communicate, through wide openings, with the stair hall. There are many coat rooms and lounging rooms, together with toilets, for both men and women.

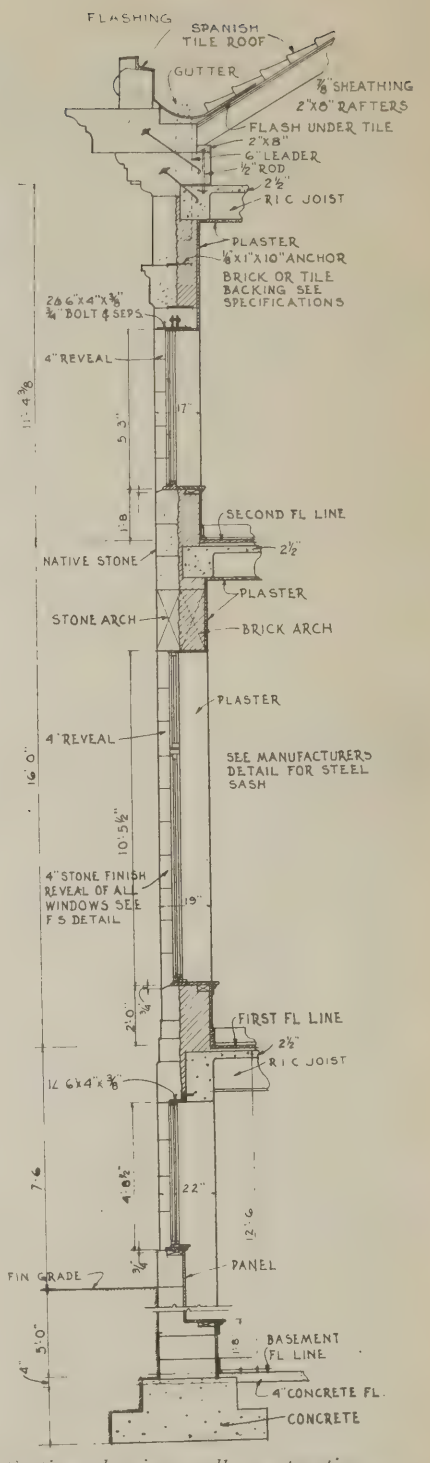
The lodge room is two stories in height. On the second floor level is a balcony and behind it is a booth for a stereopticon or moving picture machine. There is a smaller lodge room on the second floor, a game room containing a fireplace, and a library or reading room, with large closets for coats, supplies and property. The corridor is wide enough to provide for plenty of lounging room.

The kitchen, serving and banquet rooms are placed in the basement and are shut off from the fuel and boiler rooms and have special provisions for the help. A large commandery locker room with shower connection is also provided in the basement. All basement rooms are full height.

This modern building has been built as "a club home for Manhattan Masons." It has been financed as work on it progressed, without issuing any bonds and, as the lodge is able, additions in the way of interior finishing will be made and the building brought strictly up to date in its equipment. To date the building has cost about $109,000.



Basement floor plan



Section showing wall construction

Interior of the building under construction

Solid Plaster Partitions

A Discussion of a Type of Plaster Partition Having Steel Channels and Metal Lath as a Supporting Base

A TYPE of construction which seems to be gaining in interest and popularity among builders is the so-called "solid" partition built of solid plaster on metal studs and metal lath, the whole arrangement being about two inches thick and the construction details as shown in the accompanying illustrations.

The chief claim to popularity of these solid partitions is the fact that their use means an additional fireproofing precaution and a saving of floor area. Where floor space is rented at a high rate per square foot, this item is one of prime importance. The two diagrams in Fig. 2 illustrate the saving of space effected by the use of two-inch solid partitions.

It will be noted that the space occupied by the ordinary five-inch stud partitions in a building of 33,000 square feet is 6.78 per cent of the total area, or 2237.4 square feet. The same number of lineal feet of two-inch solid partition will occupy 2.28 per cent of the total area, or 752.4 square feet. The saving in space is 1485 square feet. Where the rental amounts to $20 a year per square foot this additional 1485 square feet will mean an added income of $2970 per year, and it will be proportionately greater as the rental is increased. The problem, then, resolves itself into whether this additional rental, plus the saving in fire insurance rates, will pay for the added cost of installing solid partitions when figured over a period of years equal to the life of the partition.

These partitions derive their name from the fact that they are built of a two-inch thickness of plaster reinforced with a series of vertical metal studs to which is fastened a metal lath supporting base. Three-quarter inch rolled channels are generally used for the studs and the metal lath is held fast to the studs by No. 18 gauge galvanized soft annealed wire. The studs may be fastened in the floor and ceiling by clips and expansion bolts or they may be wired to one-inch "runner channels" which are set along the center line of the partition. Another way of holding the studs is by allowing them to project into cavities in concrete slabs and filling the cavities with cement. The studs may also be held by nails driven into wood blocks which may be set in the forms where a concrete slab floor is used. All these various methods of holding the metal studs are shown in Fig. 4 and sections at the jamb for various methods of construction are shown in Fig. 5. The studs should not be spaced farther part than two feet on centers.

The illustration shown in Fig. 1 is a typical installation. The vertical channels in this case are allowed to project directly into the floor. Two-inch deep holes were drilled into the concrete, the studs were sprung into place and the cavities filled with cement. At the ceiling the studs are wired to a one-inch metal runner channel. The metal lath is applied to only one side of the studs, with the long dimension of the sheet across the studs, and with the ends of the sheet staggered one above the other. Lathing is started at the top and carried downward, with the edge of the lower sheet lapping over the upper. If metal lath is not used on the ceiling the lathing should be bent-up on the ceiling for at least six inches so that

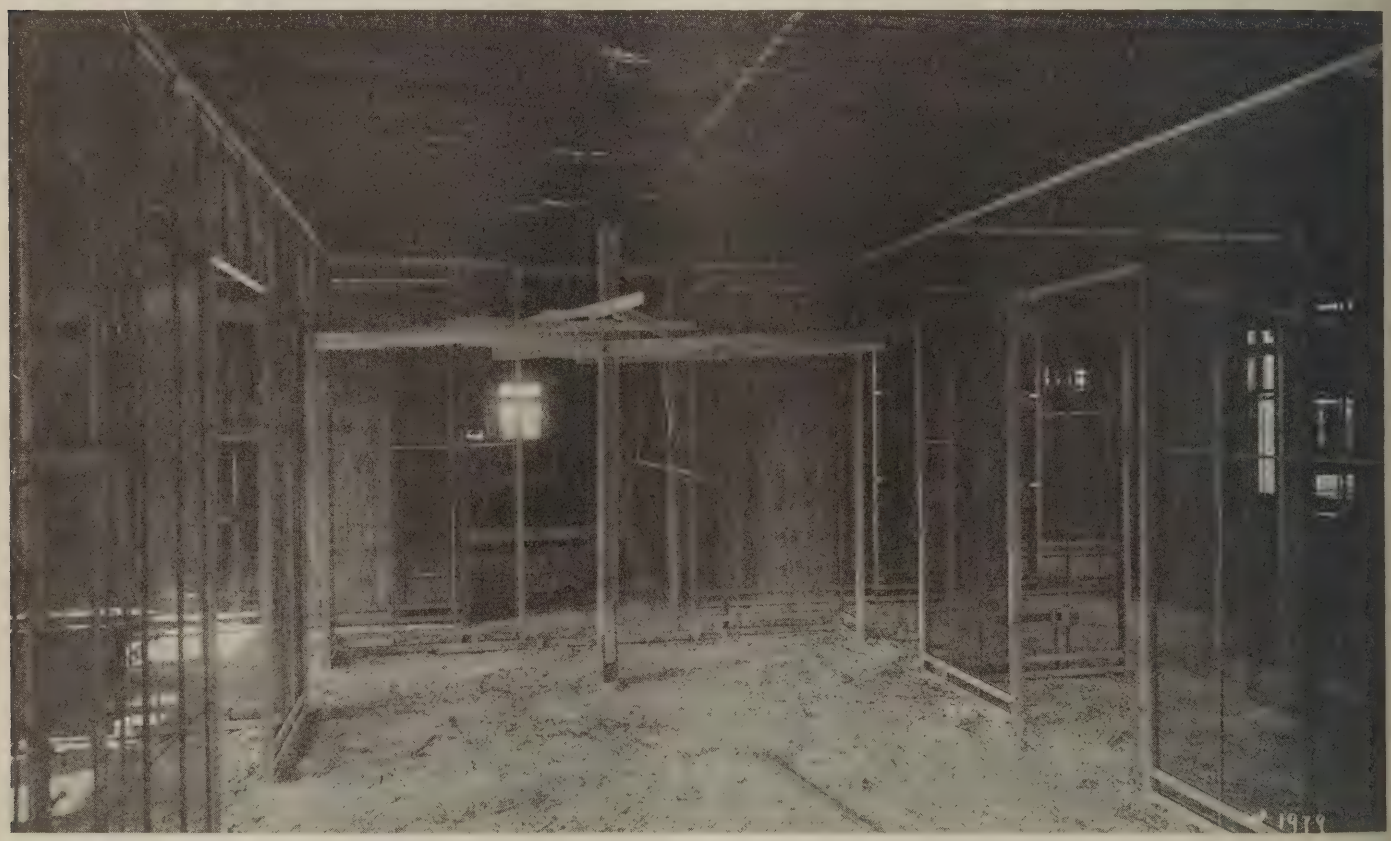


Fig. 1—Typical solid plaster partition before application of plaster. Note method of holding door bucks in place

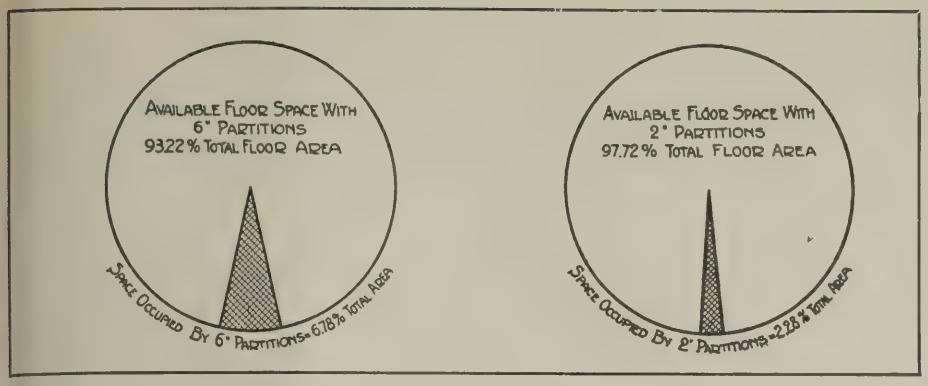

Available Floor Space With 6" Partitions 93.22% Total Floor Area
Space Occupied By 6" Partitions = 6.78% Total Area
Available Floor Space With 2" Partitions 97.72% Total Floor Area
Space Occupied By 2" Partitions = 2.28% Total Area

Fig. 2—Diagrams showing comparison of available floor space in two buildings, one with 6-inch partitions, the other 2-inch partitions; total floor area, 33,000 square feet

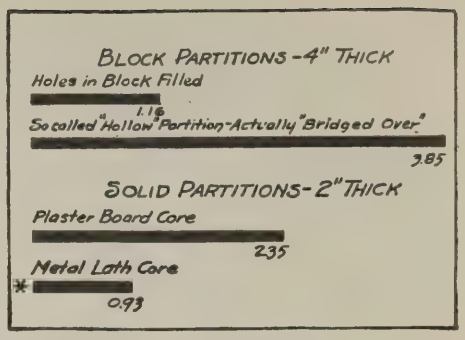


Fig. 3—Relative intensity of sound transmitted through solid metal lath partitions as compared with block partitions

no joints occur at the junction of the ceiling and walls. On walls, all lath should be started one stud away from the corner and be bent into the angle and carried on to the abutting wall so as to prevent a crack in the corner. Where ⅜-inch rib lath is used it should be butted into all joints and strips of flat lath, not less than 12 inches wide, should be bent in the shape of an "L," six inches on a side, and securely wired along each edge in all corners. It should not be fastened at the corner but only along each edge of the sheet. This "L" piece is called "Cornerite."

Lath should be wired to studs at intervals not exceeding six inches, and a tie should occur where the sides of the sheets lap at channels. There should be one tie on side laps half way between channels. Expanded metal lath should be lapped at the sides not less than ½ inch, and at the ends not less than one inch. End laps of sheets should occur between studs; the sheets should be securely laced with No. 18 gauge galvanized annealed wire. Rib lath should be lapped at the sides by nesting the outside ribs, and at the ends the lap should be one inch and the same as for expanded metal lath.

Where solid partitions are over six feet high they should be temporarily braced horizontally on the channel side before the plaster is applied.

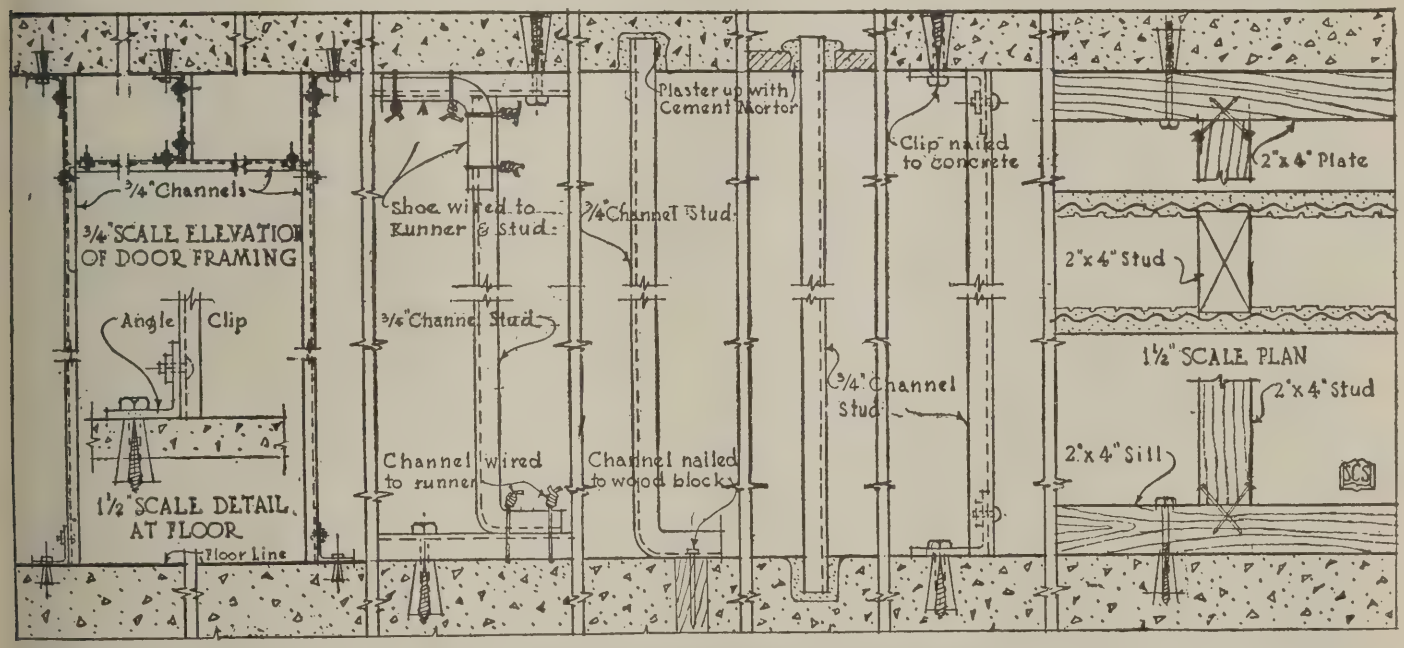


Fig. 4—Details showing various types of stud anchorages

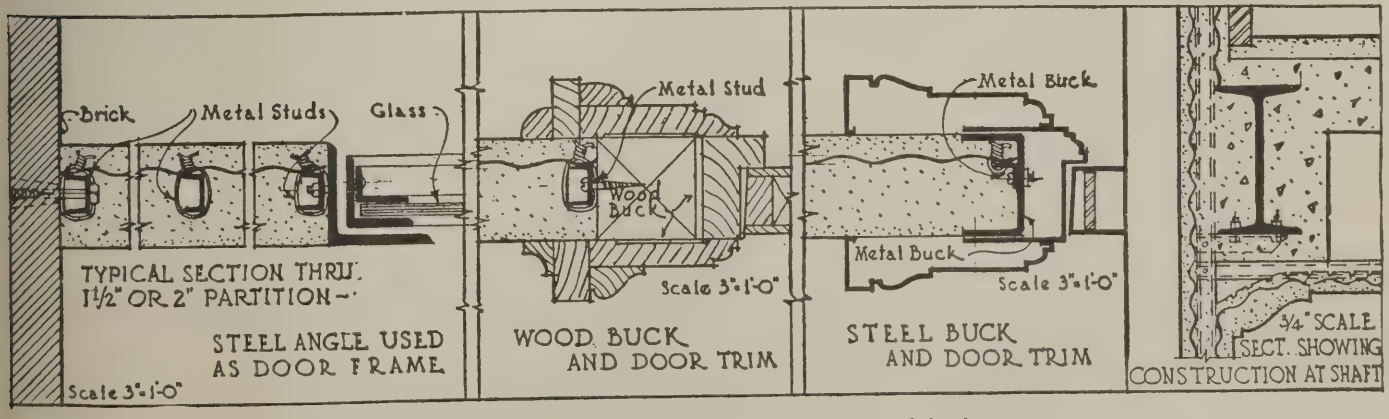


Fig. 5—Construction details for various types of jambs

Suggestions for the Beginner in Architectural Drawing

By V. L. SHERMAN

THIS penultimate article will have to do with detail outline. The illustrations are photographs from a book published for Mr. Ascher Benjamin, in Boston, in 1798. The writer apologizes for confining anything of Ascher Benjamin's to two pages, but has made use of that gentleman's drawings in order to show that the early Colonial style was not only pure, but was acquired through patient observance of proportions. In passing, your attention is called to the leading article in the *American Machinist,* September 27, 1923, which is based on an interview with Maxfield Parrish. It has to do with proportions and is worth noting.

In Fig. 1, Architraves for Doors, Windows and Chimneys, the beginner will find a very suitable sheet from which to practice. The forms give ample exercise, and while improving his technique the beginner will gain in judgment of form. That instinctive judgment of form is derived through consant practice of the best methods. The accumulation of good things in the mind, through laying them out on paper, forms a repulsive mass to all poor stuff. The curves you will note are all carefully arranged with centers and radii suitably proportioned. Nothing is haphazard, and first of all the entire form in each case is based, not on a dimension, but upon a unit or module. A draftsman has progressed a long way when he can consider form in proportion and not in size. When he can think in terms of the whole and not in separate parts. That everlasting ragging given to the average American roof is from nothing but the disregard for unity in house design. It isn't that the particular house lacks beauty, but because it lacks completeness. In using Fig. 1 as a work sheet it is suggested that the beginner copy one of the figures two or three times with care. Then laying aside both sheet and text he should try the same figure without a scale, or freehand, and afterward compare it with the original. Try each one in the same way and develop a sense of right or wrong while in the act of drawing. As a vocabulary is of value, the names of the figures follow: *A,* Scotia; *B,* Astragal; *C,* Bead; *D,* Quirk, Ogee; *E,* Quirk, Ogee and Astragal; *F,* Cymarecta; *F,* Quirk, Ovolo and Astragal; *H,* Cavetto and Astragal; *I,* Ogee; *K,* Ogee and Astragal.

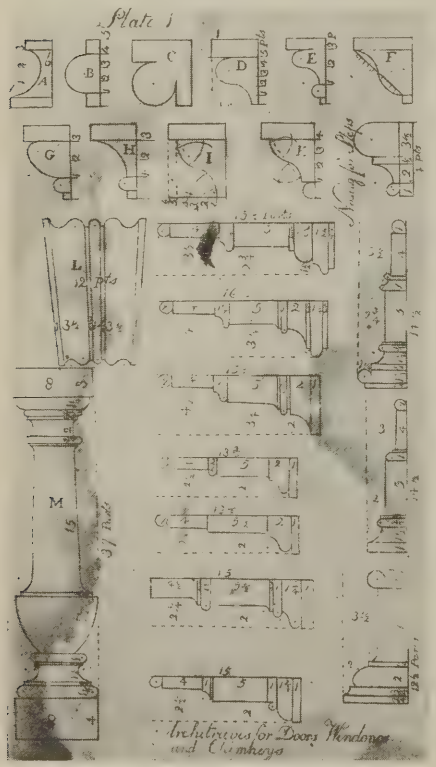


Fig. 1—Architraves for doors, windows and chimneys

Fig. 2 may seem stage property to some, but these figures form outlines that should be worked to different scales with success. Before drawing them on a board to a small scale try them on brown paper tacked to the wall. Make *one diameter* equal to eight inches and use a heavy pencil. Try them first according to the unit and then without.

Fig. 3 brings us back to volumes. This sheet will go a long way, if taken slowly and patiently, to advance the beginner in projection drawing. This consideration of volume while working on a plane surface is something that no draftsman can sidestep and succeed. The subject is a spiral hand rail. The text as written by Ascher Benjamin follows:

"This figure (i. e., Fig. 1, in the illustration) is the Plan and Scroll of the Twist Rail for a Staircase, to draw which proceed in this manner: First, describe a circle, whose diameter shall be equal to the breadth of two steps, *a, b;* then divide the circle in eight parts and draw lines from the center to each division; then draw the cord line, *c, b,* which will be a fourth part of the circle; then take 2½ inches in your compasses, and describe a circle round the center of the eye, whose diameter will be five inches; in the next place set one foot of the compasses on *c* and extend the other to touch the outside of the circle last drawn, at *i,* and draw the arch line, *i, k,* which arch is to be divided into eight parts, and a line drawn from the center *c,* through each of those divisions, and continued to the line *i, b,* will be the diminishing scale.

"To diminish the Scroll set one foot of the compasses on the center of the eye, and extending the other to *1,* on the scale *i, b,* turn it over to *1,* on the first eighth part of the circle from *c,* next semi-diameter, from the center of the eye, to *2* on the scale, and turn it over to *2,* on the second eighth part of the circle; then the distance from the center to *3* on the scale, and turn it over to *3,* on the third eighth part; then the distance from the center to *4* on the scale, and turn it round to *4,* on the fourth eighth part of the circle, and this method is observed with respect to all the other divisions, until you came to the sixth, which will fall on the scale at six.

"To find the centers for drawing each eighth part, take a distance from the center of the eye, to *b,* at the top of the scale, and with that radius, setting one foot of your compasses at *a,* of the side of the Rail where the twist begins, and describe a small arch, and with the same Radius, set the foot at *1,* on the side of the Rail, and intersect the former Arch at *i,* which is the center for the first eighth part from *a* to *1;* then set one foot of the compasses in the center of the eye, and extend the other to *1,* on the scale, and with that distance, setting one foot of your compasses at *1,* on the edge of the Rail, describe a small arch, with the

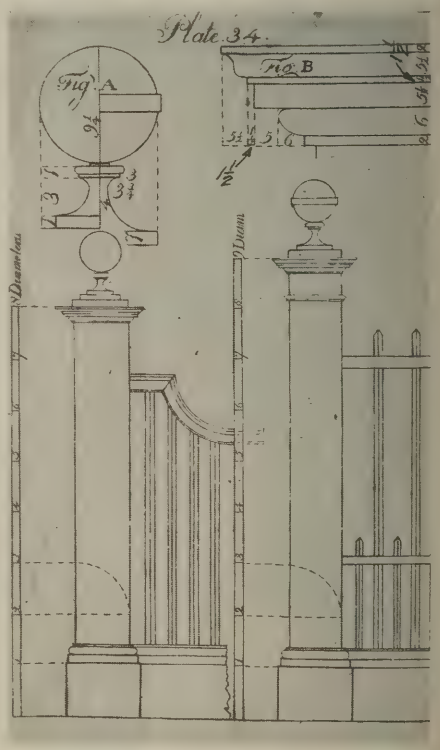


Fig. 2—Gate posts

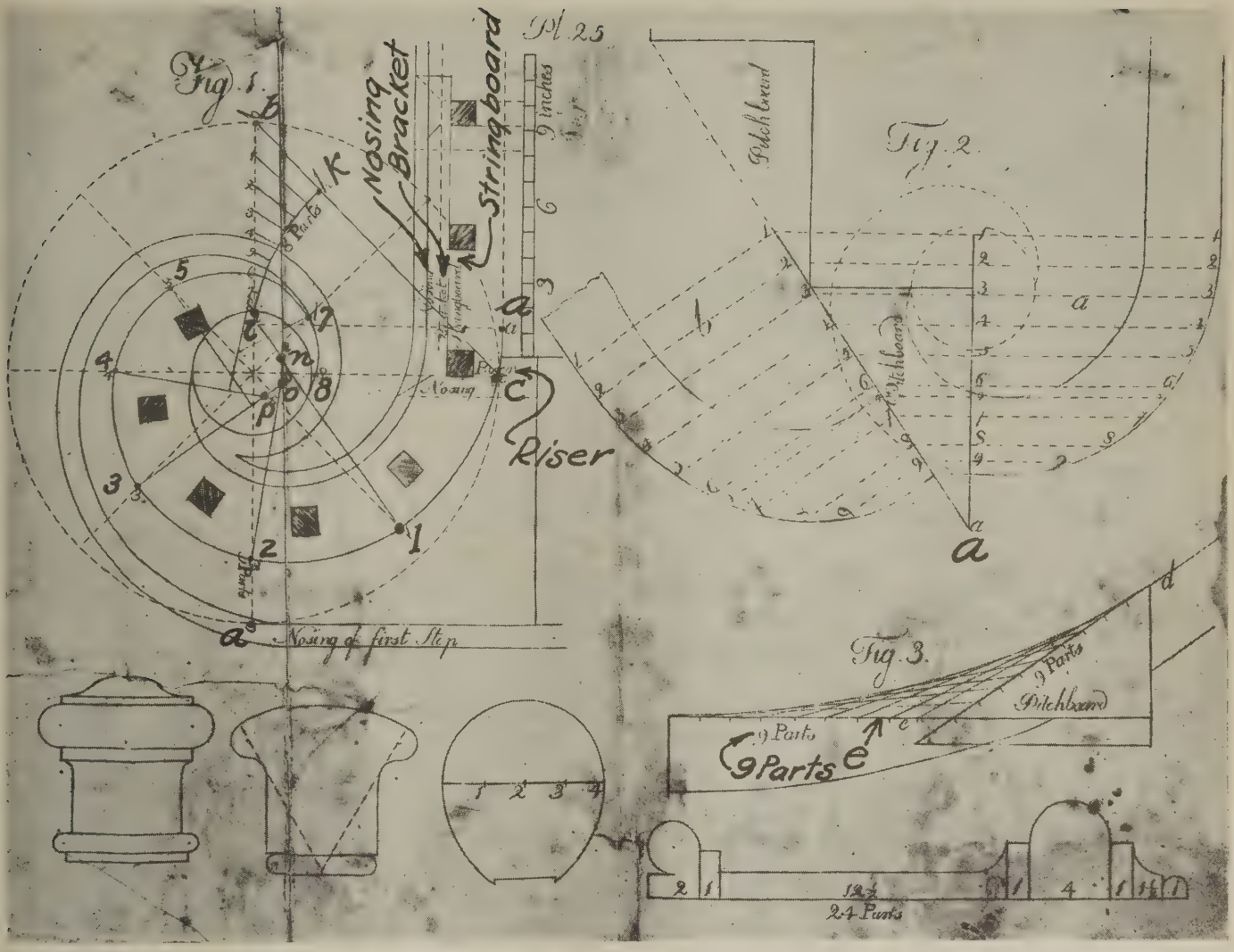


Fig. 3—Spiral hand rail layout

same Radius, placing the foot of your compasses at *2,* on the edge of the Rail, intersect the former stroke on *n,* which is the center of the second eighth part. . . . The outside of the Rail may be drawn from the same center of the inside.

"To make the Raking Mold, for the turn of the twisted part of the Hand Rail, Fig. 2 (in the illustration), first draw the plan of the Rail, as shown in Fig. 1, lay down the Pitch Board parallel with the plan of the Rail, Fig. 1; divide the line *a, 1,* in the center of the Scroll into nine parts, and draw the dotted lines across the plan of the Rail to the Raking line of the Pitch Board; in the next place, from the center of the plan, *a,* take the distance, *1, 1,* and set it on the Raking Mold *b;* then take from the plan *a,* the distance *2, 2,* and set it on the Raking Mold, *b.* . . . The inside of the Raking Mold must be taken from the line *a, 1,* to the inside of the Rail, on the plan, *a.*

"Fig. 3 is a Mold for the falling of the twisted part of the Hand Rail, from *a,* where the twist begins, to *3,* on the edge of the Rail, where it ends, the remaining part of the Scroll being level. To make the Falling Mold, take the Base line of your Pitch Board, from the center of the eye, to *2,* on the edge of the Rail, on the line *a, b,* Fig. 1; let the Raking line to the Pitch Board run at the same angles, as the Pitch Board in Fig. 2; then trace from *a* round the edge of the Rail to *3,* the twisted part of the Rail, and run those parts on the Raking line of the Pitch Board until you get to the level line *e;* then run on the level line until you have got the length of the twist part of the Rail, *a, 3;* then divide the Raking line of the Pitch Board into nine parts, and the level line into 0 parts, and by drawing right lines between those divisions, you will have the curve to the falling of the twist."

While the foregoing problem may seem difficult, the beginner is hereby warned that his avoidance of difficulties will not help him, and that the habit of approaching a problem without unnecessary concern is of great advantage. With study some sort of a solution always presents itself. On the other hand, this hand rail is used to encourage the beginner in interior work. Architects should not turn over all interior decoration to a stranger in the house, but should have capacity to carry the building clear through. Without wall decorations and furnishings many houses have a peculiar deserted appearance. With the more fortunately designed the empty home may provoke an interest or an appetite that makes the visitor feel a reincarnated owner. The old Colonial homes, from their graceful doorways to remote chimney corners, are never abandoned in appearance.

The study of mathematics should always precede or at least parallel to study of design. Maxfield Parrish threatens to reduce all of Euclid to demonstration with two pins and a string. May we venture that with two pins and a string a designer can make use of all Euclid? If he can, so much the better. All plane and solid geometrical figures are charter members. All of the curves are usable and should be familiar. We desire to go a bit further and say that no beginner in architecture can afford to limit his curriculum. The business of the architect is bound up with every human line and a wide scope is required.

The draftsman should be acquainted at least with blue-printing. He may find it desirable to reproduce drawings and unable to reach any blue printing firm. Use blue prints freely, but never loan drawings. Blue printing is discussed on the first page of "Kinks."

This view shows the Wynnton School after the remodeling had been completed. The two-story portion in the center, just behind the big tree, is the old building. Notice the two arched entrances in the new wing. These entrance-ways lead to the covered corridor in the rear, which connects with all the rooms in the new wings, and also with the two-story central portion

Solving the Expansion Problem

How a Columbus, Georgia, Architect Treated the Problem of Rebuilding a School-House to Meet New Capacity Requirements

IT is not an uncommon thing for an institution to outgrow its quarters, but when the "quarters" represent a $30,000 building only four years old the problem of disposing of it or arranging it to fit the new requirements is not one to be lightly cast aside. Just such a state of affairs confronted the school board of Columbus, Georgia, when it was found that the Wynnton School, due to the exceedingly rapid growth of a section on the outskirts of the city, was less than half large enough to take care of the children in the school district. To cast aside the existing building and erect another and larger one would have meant a loss equal to the value of the building or very near it since the salvage value of a school building is small. To keep the present structure and put up another would not only interfere with the operation of the school due to the necessity of going from one building to the other, but would also provide for no farther expansion if it became necessary. The results of the final action taken, which turned out satisfactorily for all parties concerned, are shown here.

It was decided to remodel the old building, adding enough new rooms to take care of the existing need and also providing for further expansion. The plan selected called for a one-story addition on each side of the original building.

The addition called for two wings, extending out from the main building on each side so that the completed plan took the shape of the figure E. Together, both wings provided ten additional rooms as against the eight rooms in the original building. The two wings are of the "one-room-deep" type, that is, each room faces the open on two sides, thus providing plenty of daylight and fresh air. A study of the floor plan will show that for all rooms in the new addition except those at the corners, through ventilation is possible. For warm climates through ventilation is absolutely essential and this point seems to be very well treated here.

In the rear of the building an arched corridor provides a means of transferring pupils from one room to another. It was not considered necessary to enclose this corridor, as the Georgia climate is never very severe.

This corridor starts from the side exit of the old building on each side and terminates at each end in an exit leading outside the building. Reference to the plan will show that a corridor runs from one side of the new addition to the other side, through the original building thus providing an unbroken passageway from one end of the building to the other.

Toilet facilities in the original building were located in the basement but as these were inadequate to care for the increased capacity of the new addition, more and better toilet rooms were provided in the new layout. Two toilet rooms, one for boys and another for girls, were located at each end of the building. They were so placed as to be open on two sides so that they would be well ventilated. Toilet facilities for teachers are located on the first floor of the old building.

This plan was selected for two reasons. First, because, since the original building contained a fire hazard due to the fact

This view shows the original building before remodeling. The cornice and main entrance were retained but a false parapet wall of hollow tile was built above the cornice in order to make the building conform to the new design. The little building in the rear, which was formerly the principal's office, was converted into a rest room

A rear view of the building, with the original schoolhouse shown at the extreme left. Notice that the arched window in the second story of the original building opens directly on the roof of the new addition, thus allowing the children to escape to the roof of the new wing in case the stairway in the old building is cut off by fire

that it was two stories high and contained no fire escape, the erection of a one-story building adjacent to it would allow the children to escape from the building, in case of fire, jumping from the window of the second story to the roof of the new wing instead of having to drop from the second story to the ground. The second reason for the selection of the plan shown here is that it provided a picturesque and attractive building and it could be erected at less cost than any other type. It also provided for further expansion.

The original building was built of brick, but the new wings are hollow tile construction covered with white cement stucco. Tin is used for the roof covering. In order to conform with the appearance of the new wings, the mortar was chipped out between the bricks of the old building for about one inch and 20d nails were driven in the mortar joints to hold the stucco. The original cornice and entrance of the old building were retained, but a false parapet wall was added in order to carry out the general design.

As the floors of the new addition are about three feet above the ground, ramps were built to lead from one level to the other. It has come to be generally accepted that where crowding is possible, ramps are preferable to stairs, and this fact was not overlooked here.

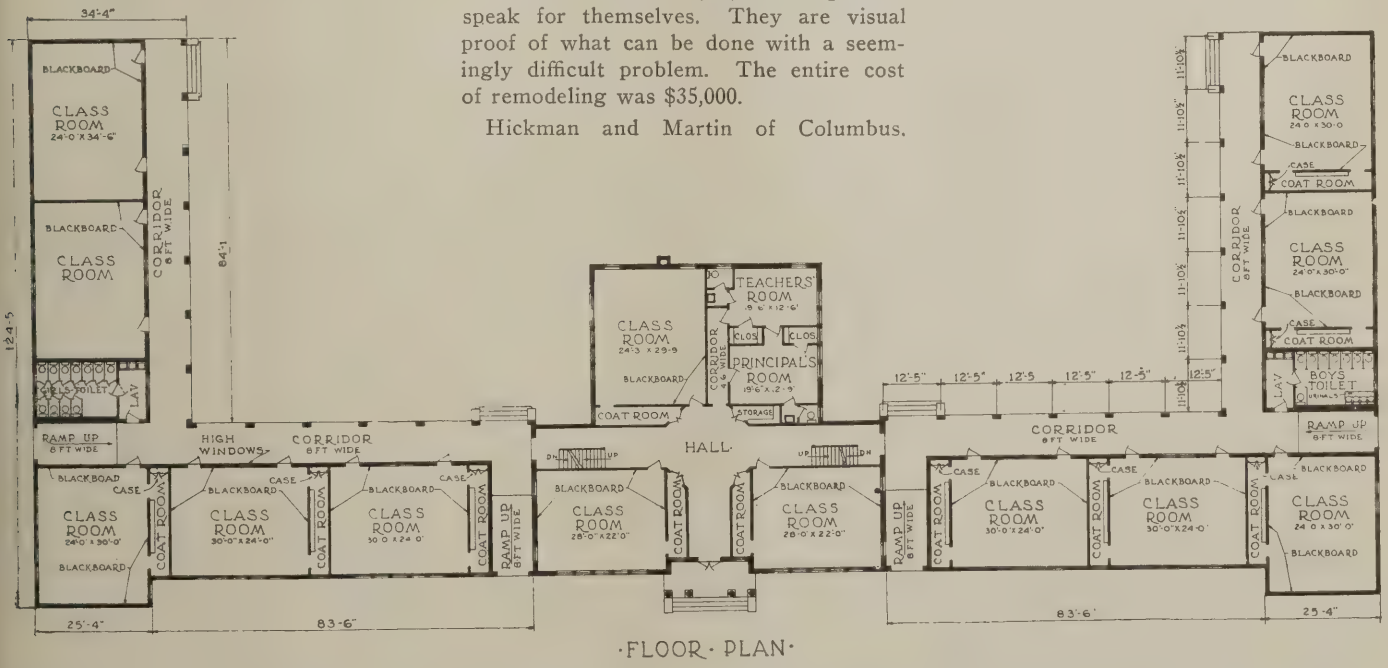
The remodeling of the original building consisted in bringing the principal's room from an old building in the rear of the old school-house to the ground floor as shown in the plan. The building which was formerly occupied by the principal's office was converted into a general teacher's rest room. An additional heating plant was installed in the basement of the old building to supplement the original heating unit. The new wings are built without basements.

It is hardly necessary to praise the work in connection with this job, for the pictures speak for themselves. They are visual proof of what can be done with a seemingly difficult problem. The entire cost of remodeling was $35,000.

Hickman and Martin of Columbus, Georgia, were the architects who had charge of the work and Charles T. Gifford was the general contractor. John Flournoy was president of the school board at the time the work was done.

Dummy Not Responsible

A RECENT decision by the New York Supreme Court regarding the responsibility of the undisclosed principal who purchases real estate through a "dummy" has aroused considerable interest among builders. This decision states that the sale or purchase of real estate through a third party acting as a mask for their dealings, though sealed and wafered, does not relieve the true principals from responsibility. It is expected that this will prevent many frauds such as have been perpetrated in the past when dummies were used. The actual principals will have to cover damages for contractual default.



·FLOOR· PLAN·

First floor plan of the completed school. The central portion is the original building. Notice that the exits from the old building open on the corridors which connect to all rooms in the new addition. Further expansion is possible by the extension of the new wings

The Building Outlook as Seen

M. G. BENNETT, General Manager, SAMUEL CABOT INCORPORATED, Boston—Although our volume of business for the first six months of 1923 eclipsed even the banner year of 1922 for the same period, and the months of July and August showed a slight falling off in comparison, September has brought a return of the record business of the spring months. Excess of building in certain sections has caused a hesitation, due to the excessive costs of material and labor in those sections that were the natural results of immediate demand exceeding the supply, but in other sections the volume has kept up, especially in residential construction. This is a healthy situation, in our opinion, because it leads to a normal, steady growth which in the end will be much better for the owner, contractor and manufacturer.

M. G. Bennett

In spite of some predictions to the contrary, we feel that the country has by no means caught up with the shortage of building incurred during the six years from 1914 to 1920 and that the abuses of over-exploitation of city properties by certain financial institutions will be the only harmful reaction that we have to fear; and that that will be local and temporary.

STANLEY H. BARROWS, President, NATIONAL KELLASTONE COMPANY, Chicago—My view of the building situation as it relates to the oxy-chloride products or caustic magnesia cement industry is as follows:

The total volume of oxy-chloride materials consumed in construction in 1923 has shown a substantial increase for the period over any previous year.

In general, shipments made thus far in the present year by the major or principal manufacturers are but slightly in excess of those of a year ago. The increase in total shipments is the result of entry of a very considerable number of new producers in this field of operations.

Selling prices of the principal products—stucco, plaster, and flooring—are about 10 per cent above those of a year ago. Production costs have risen from 14 to 18 per cent, due almost entirely to rising wages of labor, accompanied by diminishing efficiency.

Manufacturers have been intensely endeavoring to increase the volume of output to reduce the cost of transacting business with but mediocre success. This, combined with the increased number of local producers, has brought about vigorous competition and numerous price concessions and, as a result, selling prices have not kept pace with the advance of increasing costs.

Stocks in the hands of dealers have been held at minimum throughout the year, which condition still exists. Reports of building conditions throughout the country indicate a satisfactory amount of construction activity, especially in average cost homes. Due to the relatively small stocks of oxy-chloride materials in the dealers' hands, there can be little doubt that an active demand for these products will continue until the holiday season.

Orders booked during the latter half of September by my company for October shipment are heavier than at any previous time of the year.

G. K. SPECHT, JR., General Sales Manager, HERCULES CORPORATION, Evansville, Indiana—Considered from our viewpoint, as manufacturers of gasoline and kerosene engines, the outlook for continued activity in the building field is good. Heavy buying by the manufacturers of power operated equipment, used by contractors and builders, indicates an optimistic faith on their part in the continuance of building operations on a large scale. The scarcity and high cost of labor is an unfavorable factor, but this handicap has been overcome to a considerable extent, through the greatly increased use of that type of machinery which replaces hand labor. Orders and inquiries, which continue to come in from all parts of the country, show that builders and contractors everywhere are substituting engine power for hand power wherever it is possible to do so. In my opinion there will be no permanent let-up in building activities until the crowded and unsatisfactory living conditions in our cities have been relieved through the erection of an adequate number of residences and apartment houses.

G. K. Specht, Jr.

G. L. CANINE, Contractor and Builder, 2418 East Grand Avenue, Des Moines, Iowa—The prospects for building in Des Moines in the near future are good. During September of this year the number of building permits issued surpassed all records of building permits issued in other months in the history of the city.

The demand for homes on the installment plan will continue to be brisk, judging from the number of inquiries. Des Moines is a home-owning city. One per cent over half of all the families either own or are paying for homes.

At present there is a supply of building mechanics of all crafts, with the possible exception of brick masons. If the weather remains favorable, we will have all and more than we can do until the first of the year and probably all winter.

FRANK F. HASE, C. H. & E. MANUFACTURING CO., Inc., Milwaukee—I am very optimistic about the future and feel that the Presidential election will not interfere with the building of roads, schools, public buildings, etc., for 1924. When the foreign situation is cleared up, business will come on with a rush, and the little feeling of unrest at the present time among the manufacturers is that they want to be cautious in ordering materials, etc., until they have some assurance that the foreign situation will be cleared up.

Frank F. Hase

We have done a splendid business this year, the biggest in the history of our company, and our increase has been all the way from 12 to 64 per cent over and above each month's business.

We had a little hard pulling to get our sales to beat September sales, but this month is coming on with a rush again, same as it did last fall at this time.

As advised, we are all very optimistic of the future and we are coming out in the spring with some new machinery which will be a big boost for our business for 1924.

H. H. BAKER, Secretary, STERLING WHEELBARROW COMPANY, Milwaukee—The distribution of our product extends into each section of the country, every important city, and small town, and the demand for wheelbarrows generally has never been so great or steady as it has been thus far during the year 1923. It is my opinion that we must continue building activities for some time to come, merely to retake progress lost during the inactivities of the war years. There is no reason ap-

by Leaders in the Industry

parent to me which should retard construction. Prices are steady, wages are good, and industry again sound. The outlook is bright. The intermediate buyer could help business, and greatly aid the ultimate consumer if he would cure himself of the "first of the year habit," of the "inventory nightmare," and have stock to deliver. Why not forget there is a January first that some folks take three months to worry about? Then there would be every chance for steady building.

JAMES M. TRIGGS, President, THE MAJESTIC COMPANY, Huntington, Ind. —The writer is too much of an optimist to predict anything contrary to a healthful continuation of the building program.

James M. Triggs

I refer especially to moderate priced modern homes for which there has been a great demand, not only in the smaller cities, but in suburban districts convenient to our great industrial centers. While some comment is made on the high cost of building, yet when we consider the buying power of the great army of executives and employes, as compared with the income of the same class of people at the time building costs were considered normal, the present cost is not far out of line.

Then, too, we overlook the fact that the average modern home built today means much more to the occupant than in former days, before so many new and convenient comforts and necessities were included in the final cost.

While the writer enjoys the privilege of living in a modern home or one that was considered modern fifteen years ago, yet I, like many others, am anxious for the time when I can have a home of more modern architecture, which will include the modern laundry equipment, metal basement windows, built-in incinerator, built-in kitchen outfit complete, including milk and package receiver, built-in side-board, ice box with outside door, coal window protecting the building, improved heating system, a dream of a bath room, built-in book cases, casement windows, brick fireplace, cedar lined clothes closets, and many other items that make the modern home of today strictly up to date and one to be enjoyed. I really feel that those interested in studying and supplying modern conveniences which add cheer and comfort to the home have kept pace, if not excelled, those interested in a similar way in the automobile industry.

Our salesmen who cover a large part of the United States, report a good outlook in the building industry for 1924, and we feel confident that it will equal, if not exceed, that of 1923, which thus far has proven the best year in the history of our firm.

R. G. WALLACE, General Manager of Sales, NATIONAL FIREPROOFING COMPANY, Pittsburgh—We have made a careful survey for the past 60 days of prospects for future building, and as far as we can learn there is every evidence of a fairly even demand for the next few months for our commodity, hollow building tile.

There have been innumerable articles published that there will have to be a material recession in prices of building materials before the manufacturers and others interested in the building construction industry can hope for an even flow of good business. However, before there can be any recession in price, there will have to be a general lowering of wages in the building industry, and conditions at the present time do not point to such a decline.

It is perhaps true that there will be a falling off in the demand for higher priced homes—homes selling from $10,000 upwards —due to most of this demand having been filled during the past five years. However, there are literally thousands of prospects who are anxious and can afford to build homes under that figure. We anticipate that the demand for this class of construction will take the place of the higher priced buildings during the year 1924, and eventually that the prospective builder of the lower priced home will change his ideas concerning the finish, fixtures, and other things that enter into the building of a home, and thus bring the price down to a point where he can finance the operation and go ahead with it.

In our industry we look forward with a great deal of optimism to future prospects for business and, unless some serious factor enters into it, we believe that our convictions will be borne out through the forthcoming months.

C. E. CONYBEARE, Advertising Manager, ARMSTRONG CORK COMPANY, Linoleum Division, Lancaster, Pennsylvania —We are looking forward to continued good business throughout this fall, as well as into the spring. Reports from our various offices, which are located in the East, Middle West, and Far West, show a very strong demand for all types of linoleum, especially for use in new construction already under way or being planned.

Linoleum makes an ideal flooring for fireproof construction and is being specified very largely for floors in business buildings. This is one factor that has been responsible for the heavy sale during the past six months. There is also a growing use of this material for the floors of kitchens, bathrooms, sun porches, and bedrooms, to be installed at the time new houses are being erected. In a two-year period the sales of linoleum for these various uses have increased on an average of 22 per cent.

As we see it, conditions are basically sound, and there is every indication that business in our line will be brisk, at least throughout the remainder of this year.

J. FRED WRIGHT, SARGENT & COMPANY, New Haven, Connecticut—It is our opinion that the building outlook is very good. Business in the hardware industry at the present time is above the standard, and we believe that the same condition will exist for some time.

MILTON D. JONES, Secretary-Treasurer, RICHARDS-WILCOX MFG. COMPANY, Aurora, Illinois—Judging from our own business we believe that building will continue active until the end of the year. This is true especially in the larger and medium sized cities. Whether the building program will be as active next year as it has been during 1923 is problematical but the surface indications are that there will be a good run of building business.

Milton D. Jones

We believe that people generally are in the mood to go ahead and do business and, if conditions are made right fundamentally, there is no reason why there should not be a fair degree of prosperity for a period of years. Prices of farm products, however, must be more in line with what the farmer has to pay for what he buys before there can be assurance of a permanent and a maximum degree of prosperity.

The plane of living is higher now than ever before. People are demanding better things in the way of homes, food, clothing, transportation, educational and recreational privileges, etc. What were considered luxuries yesterday are necessities today. That very thing makes for better business all around if it is not carried too far. If people generally will be a bit steady and politicians will not "rock the boat" so that there is a reasonable assurance that as a nation we shall have wise and efficient leadership the natural growing demands of this great country should insure a healthy and steadily increasing business. We of the Richards-Wilcox organization are conservatively optimistic as to the future.

Kinks from the Job and Office

By V. L. SHERMAN

Send in your kinks—give the benefit of your experiences to the other fellow as well as get the benefit of his. NATIONAL BUILDER pays $5.00 for every kink published.—The Editor.

Blue Printing

REQUESTS for information on blue prints are answered briefly here. Blue printing is a business of itself in larger cities and it takes an old timer to remember the days when a good many made their own blue print paper and obtained their own blue prints. This paper, accurately sensitized for various speeds in sun light or under an electric light, is sold in rolls. As opened rolls spoil before a great while, only those using the paper constantly profit by their purchase. Blue

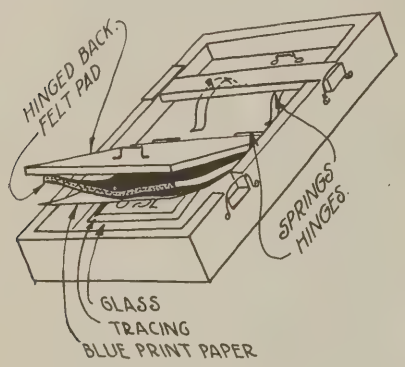


Fig. 1—Hinged blue printing frame

print paper can be made, as Mr. Thomas E. French tells in his book, "A Manual of Engineering Drawing," by using "a white paper free from sulphites, coated with a solution of citrate of iron and ammonia and ferricyanide of potassium. On exposure to the light a chemical action takes place, which when fixed by washing in water gives a strong blue color. The parts protected from the light by the black lines of the tracing wash out, leaving the white paper. . . . The following formula will give a paper requiring about three minutes exposure in bright sunlight:

"1. Citrate of iron and ammonia (brown scales) 2 ounces, water 8 ounces.

"2. Red prussiate of potash 1½ ounces, water 8 ounces. Keep in separate bottles away from the light. To prepare paper take equal parts of (1) and (2) and apply evenly to the paper with a sponge or camel's hair brush by subdued light."

Fig. 1 shows a printing frame which may be used with satisfactory results if the felt pad and backing keep the tracing and blue print paper in close contact against the glass. The back may be made with or without the hinge, but a hinge allows examination of the print while insuring against relative movement of the paper and tracing.

On complete exposure the paper will show a blue-gray background with the lines lighter than the background. It should then be carefully and evenly washed in a bath of clear water, without crumpling, for four or five minutes. If the print has been over-exposed, or "burned," as it is called, it should be dipped for a moment in a bath "containing a solution of potassium bichromate (1 to 2 ounces of crystals to a gallon of water), and rinsing thoroughly. . . . Sodium bichromate is the generally used substitute since potash has become so scarce."

Blue prints can be made by holding the tracing and paper against a window pane, and typewriting can be printed by using a carbon faced toward the reverse side of the sheet to print the letters on both sides. Red ribbon letters are sometimes as effective because that color excludes the effective light.

Why Not a Dumb Waiter?

THE following letter comes from F.C.F., of Ambridge, Pennsylvania, and from its tone we believe he knows all the comforts of home or has at least been instructed therein. We believe that just such additions in a house create an attraction. "We are more or less familiar with the clothes chute and its attendant advantages, and I guess it is agreed that there are only two logical places on each of the first two floors for its entrances, the kitchen or pantry on the first floor and in the hall or bathroom on the second floor. Did it ever occur to you that the clothes that go down so easily have to be carried up? And that a dumb waiter right beside the chute would only take up a space about 2 feet 6 inches square? Think how convenient it would be to have a table under both of these in the laundry, with an ironing board or machine close by. The table could be used for sorting the soiled clothes and holding the ironed ones. Then when there is sickness in the house the dumb waiter carries the tray for you, which after being used is set back on the dumb waiter. The additional expense would not be great, and the space occupied is small. The steps saved are beyond tally."

A Lasting Monument

A YEAR ago September the editor of "Kinks" made comment on Frank Floyd Wright's new Imperial Hotel in Tokyo to distinguish between "making good" and "getting by." After the Japanese quake of last month confusing reports spread as to the extent of damage to this building. We wish to remark that two architects of Chicago, in close touch with the facts, have confirmed the latest reports. The Imperial Hotel was undamaged and was used as a haven. We wish further to say that the designer did not accept the orthodox methods in building but anticipated the shock. Without alluding to its exterior design, which is beautiful, we would liken it to a modern ark. The moral is: find out for yourself.

A Handy Tool

A. R. writes from California that he has a handy tool in the one shown, Fig. 2. "This home-made tool is very useful. Take a piece of 1 inch steel tubing,

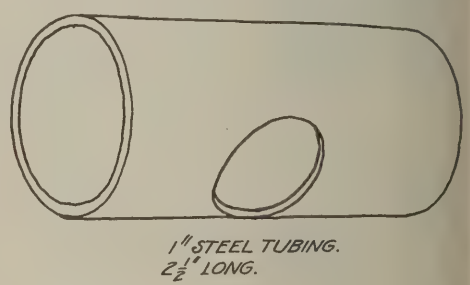


Fig. 2—Steel tube shave

2½ inches long, and cut a round hole in one side. Then sharpen the edges. With this tool I can round the corners off handrails or casing in half the time required when using a block plant or spoke shave."

Seepage-Proof Reservoir

G. E. C., of Doland, South Dakota, writes to inquire about "a concrete reservoir that is 16 feet in diameter and 18 feet deep, with 8-foot reinforced side walls—bottom 16 inches. It was built in a low, wet place, and they are bothered with seepage from the outside, and want to waterproof same. It is used for the artesian wells to flow into, and then pumped into an elevated tank, and then through the mains. There is a 4-inch pipe from near the bottom of the reservoir to the pumping plant some 300 feet away. Should there be any trouble from expansion or vibration in making it a perfectly watertight job?"

The advice offered by the Portland Cement Association was the use of metallic waterproofing compound, of the general character of ironite. So far as the wall is concerned there surely is nothing better,

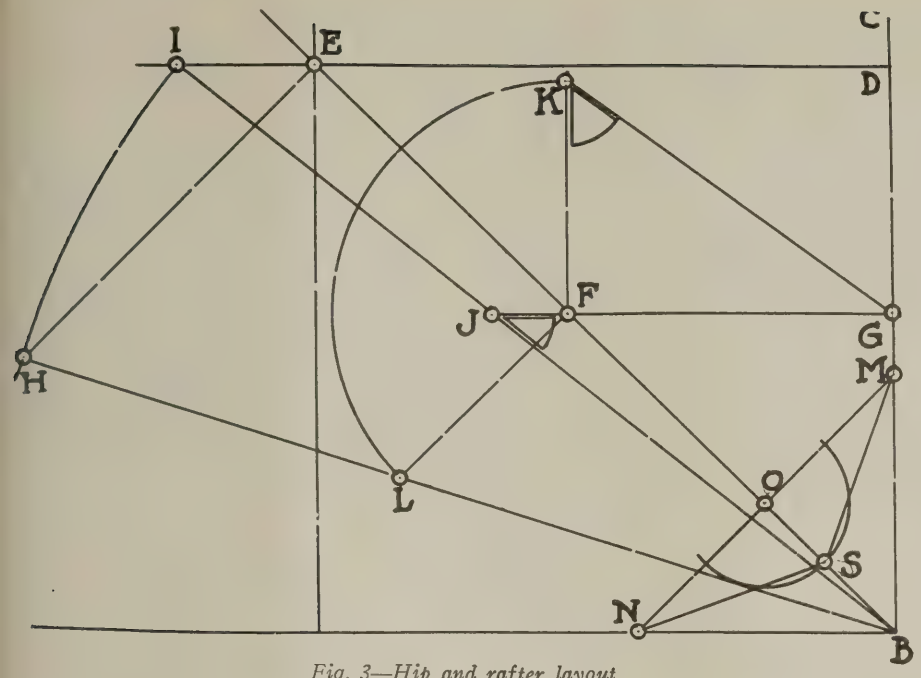


Fig. 3—Hip and rafter layout

but the editor would like to know through these pages of the trouble and remedies of some who have had experience with leaky connections through concrete walls, whether by concrete faults or the jar of pumps extending through the pipes.

Lengths and Bevels of Hip and Jack Rafters

THE following sketches, Figs. 3 and 4, are submitted to show an easy way of determining the angles in hips and jacks. The text: "The lines AB and BC in Fig. 3 represent the walls at the angle of the building. B is the foot of the hip rafter, and GF of a jack rafter. Draw EH at right angles to BE and make it equal to the rise of the roof. Join B and H, and HB will be the length of the hip rafter. Through E draw DI at right angles to BC. Upon B with the radius BH describe the arc HI, cutting DI in I. Join B and I, and extend GF to meet BI in J. Then GJ will be the length of the jack rafter. The length of each jack rafter is found in the same manner by extending its seat to cut the line BI. From F draw FK at right angles to FG, also FL at right angles to BE. Make FK equal to FL by the arc LK, or make GK equal to GJ by the arc JK. Then the angle at J will be the top bevel of the jack rafters, and the one at K the down bevel.

"Backing the hip rafter. At any convenient place in BE, as at O, draw MN at right angles to BE. From O describe a circle, tangent to BH, cutting BE in S. Join M and S, and N and S. These lines will form the proper angle at S for beveling the top of the hip rafter."

Lathing in Sections

E. P. McC. writes from Indianapolis: "The suggestion by A. G. H. as to nailing lath to 1x4's on the floor and then elevating same to ceiling and nailing it blanket form to the joists is not well put. He has advertised to the world that his "hand" has not been educated as it should be. Give a bunch of lathers their choice and they take the ceiling every time. Neither is nailing 'straight up' a 'bungaboo' to experienced carpenters. It is easy to educated hands. Too often there are men at an advanced age dropped out of clerical positions and from necessity are forced to a mechanical job. They are to be pitted if their hand was not trained in the days of their youth to do their bidding. This is where our trade schools are doing inestimable service to the old men of the future 'who lose out.' Lath, in blanket form, are on the market by many firms, but I much prefer the individual lath, as a break can be made on a new joist or stud at intervals of 10 or 12 lath, while the assembled lath compel a continuous joint on a single stud or joist, which is not a first class arrangement for good plastering. It is too late to benefit the old fellows, but let us see, as far as we are able, that the hand as well as the head of the youth is educated."

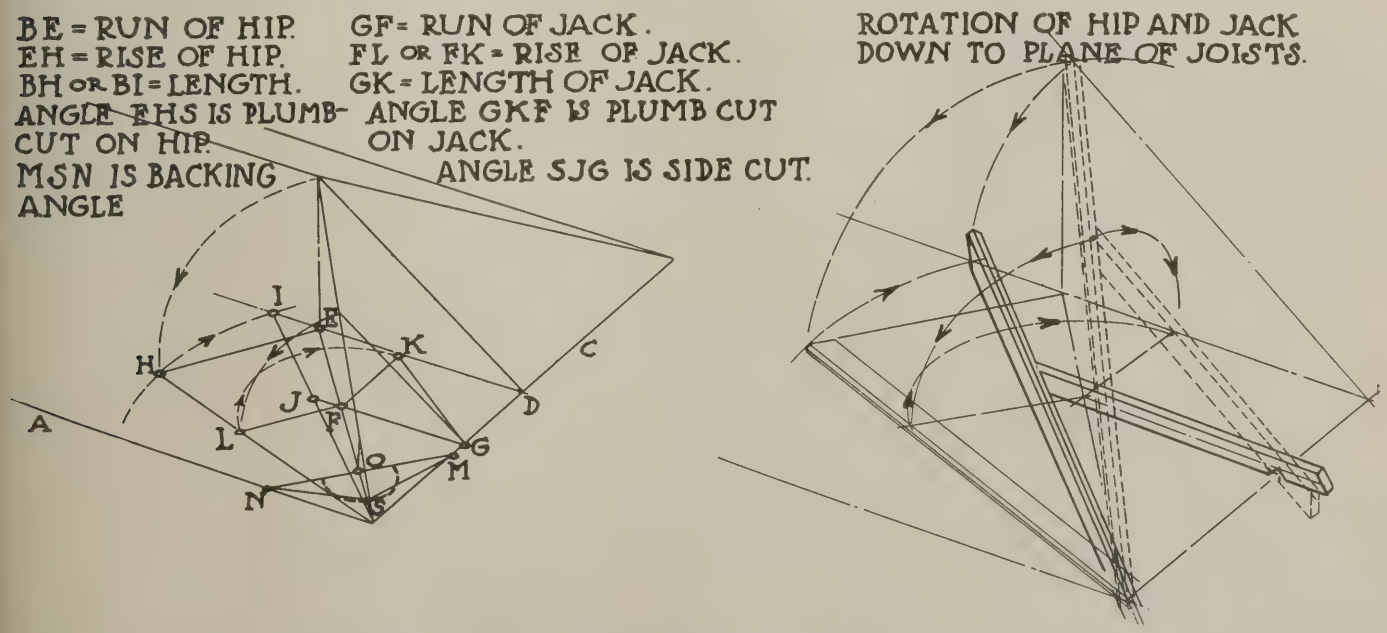


Fig. 4—Perspective views showing revolutions of rafters as indicated in Fig. 3

"Don't Thow Them Away"

THE "colyumists" in the daily papers used to have fun over what to do with old safety razor blades. Here is one use to which they may be put as B. W. C., of

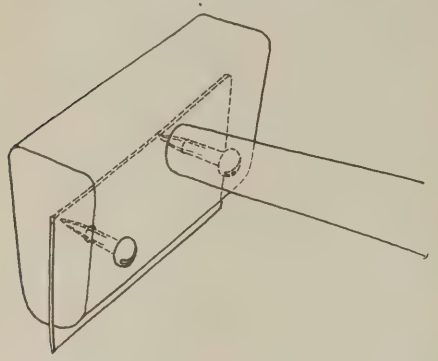


Fig. 5—Safety razor cabinet scraper

Medford, Massachusetts, shows in Fig. 5: "I am enclosing a sketch of a small cabinet scraper made from an old safety razor blade. Take a small block of wood, ¾x1½x1¾ inches, saw a slot in it about ¾-inch deep, and bore a hole for the handle. Two screws hold the blade in the slot. This is a very handy little scraper for small work."

A Sidewalk Rampant

LAST winter the editor of this department took some pictures of what he thought was deliberate slighting of work. The subjects were unprotected concrete work in winter and kindling sub-floors. Since that time the same builder has erected a row of stores on a business street and adjoining an electric line and railway line. As the builder has occupied

Fig. 6—A badly double-pitched store sidewalk

one of the stores as his offices, we take it for granted that the work is satisfactory so far as he is concerned, and that any faults attaching are not intentional. So the writer will withdraw his surmises on intentions, and lay the poor concrete work and the sub-flooring to thoughtlessness. This same builder has put in such a badly pitched sidewalk that he will drive all the pedestrians to the other side of the street and probably will have to entertain the claim agents from both the lines of transportation. Fig. 6 shows the sidewalk approach to the crossing, and it is not hard to imagine what conditions will be when a coating of ice has formed. When planning a business block a builder may well concern himself with his tenants' future business. And a good approach is half the game.

Guaranteed Dry Cellars

THE steward, or purser, of this department has had a few pokes lately on dry cellars. As a matter of fact he never heard so much about wet cellars as he has since water-proofing mixtures came on the market. It is true all of us are growing more finicky about getting our feet wet, but he places most of the trouble to the haphazard selection of cement blocks. As one contractor put it: "Some of those cement blocks are so full of holes they'd float if they weren't so full of holes. That is about the size of it. And nothing in the way of water proofing outside of a good lathering with pulverized iron would ever water proof a wall built of them. Some blocks are nothing short of sponges."

A well made concrete or cement block wall should be fairly water proof if it is surrounded by a broken joint drain. If, as the following letter suggests, you place clinkers or similar material next the wall so much the better. But ordinarily we would say there is no excuse for a wet basement. A friend of mine, in an Illinois town which has the sad experience every spring and fall of a back-up sewer system, has concocted another flood preventive. This kink may interest some reader. When the sewer backs up there is enough head to loosen a stopped trap on the cellar floor. From what I know of the town I should say there was about 5 pounds to the square inch in some cases. So instead of disturbing the drains he covers them with a small bonnet which is tapped for a pipe. About the time of the deluge he inserts a pipe which will rise above the high water mark, and if the sewer backs up the head of water is taken in the pipe and does not overflow on the floor.

The letter following gives the ideas of C. W. J., of Macon Georgia:

"I have before me a very elaborate specification for drying a cellar to be constructed, and the same leads me to offer this letter. The specification reads: 'The exterior of the cellar walls below grade shall be plastered one coat of portland cement and sand mixed 1-2, this plaster will then have a heavy coat of ————'s Liquid Waterproofing, and when dry the above shall be repeated. This specification must be strictly followed and a dry cellar is guaranteed.' Note the guarantee.

"To build a dry cellar excavate 12 inches wider than the wall. Then at the bottom of the footing lay a 4-inch open-joint terra-cotta drain graded to some outlet, and when this pipe is in place fill the excavation to within a few inches of the grade with rough clinkers. This will insure a dry cellar as the water will follow the line of least resistance.

"If it is desired to have a dry cellar floor where the building is already constructed try the following: First lay a 6-inch open-joint main of No. 2 terra cotta pipe graded to some outlet and at intervals of about 4 feet lay 3-inch agricultural drains graded to the main. In making ditches for the pipes, cut them some larger than the pipes, then over the entire floor put down 4 inches of well tamped dry gravel, and over this put a topping of cement and sand, mixed 1-2. The nearest I have found to a water proofing addition to cement mortar is about 10 per cent of hydrated lime."

Cinder Concrete

J. A. B. of Rumford, Maine, writes: "Would you kindly inform me whether black ashes, as they come out of paper or cotton mill boiler rooms where they use soft coal, could be used as building material for two or three story houses?"

Virgil G. Marani, chief engineer, Gypsum Industries Association, Chicago, replies as follows:

"It is understood that your question involves the making of blocks or similar building units composed of a mixture of ashes with portland cement in suitable proportions. Blocks or tile of this kind, usually termed 'cinder concrete blocks,' have been used with success in the construction of two- or three-story buildings and also for the foundations of buildings of wood frame construction and hollow building tile.

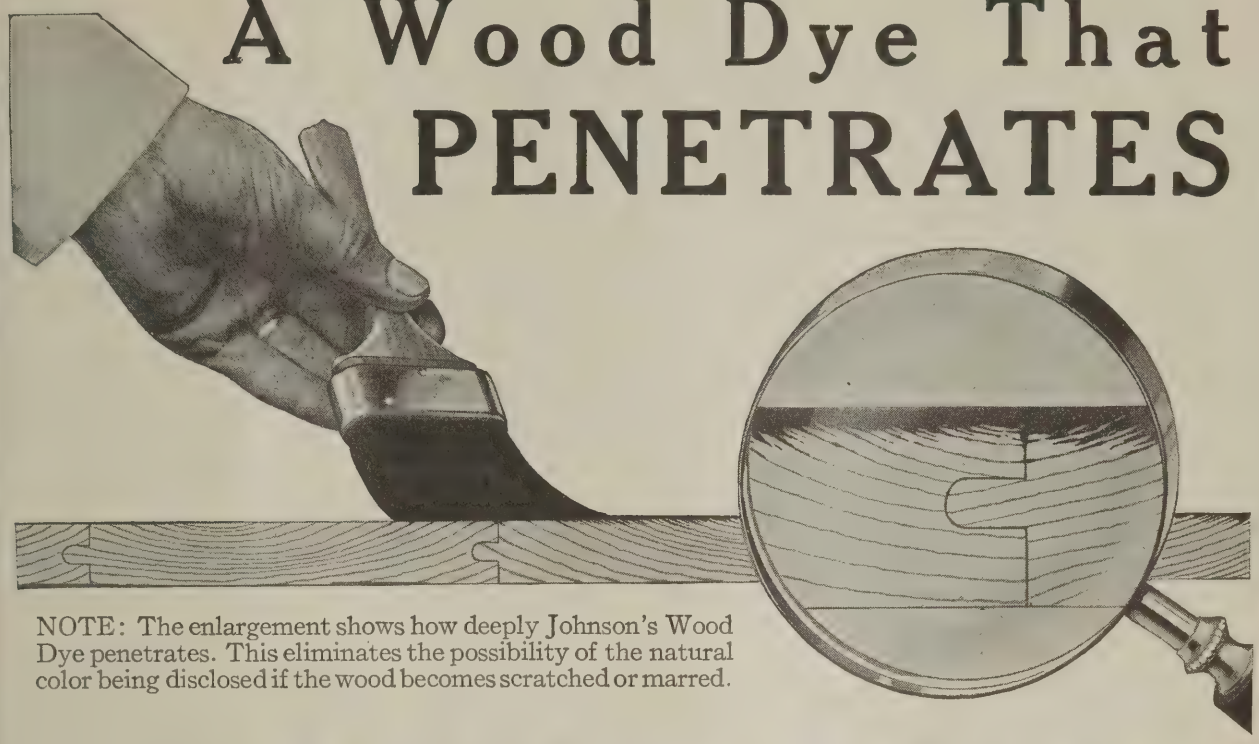
"It must be clearly understood that ashes are not suitable for the manufacture of cement blocks of this character because much depends on the kind of ash employed, also whether it is the product of the combustion of wood, bituminous or anthracite coal.

"Assuming that you mean cinders when referring to 'ashes,' I would advise that common practice is to restrict the use of cinders to such as are obtained from the complete combustion of good anthracite coal. The use of cinders resulting from combustion of bituminous coal is not common practice and is not recommended because such cinders are not hard enough; they contain too much ash and dirt and are also liable to contain particles of unburned material or sulphur.

"The presence of unburned material or sulphur will contribute to the destruction of the block. Block made from such cinders will cause popping due to oxidation, and also staining of the plaster or other finish from the sulphur content.

"A commercial cinder concrete block or tile should be made from portland cement with not more than three parts of washed cinders procured from complete combustion of good anthracite coal."

A Wood Dye That PENETRATES



NOTE: The enlargement shows how deeply Johnson's Wood Dye penetrates. This eliminates the possibility of the natural color being disclosed if the wood becomes scratched or marred.

JOHNSON'S WOOD DYE

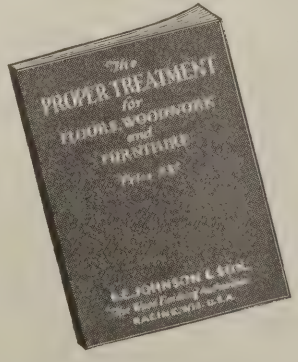
Johnson's Wood Dye is entirely different from the many wood stains and tints on the market. With it inexpensive soft wood such as pine, cypress, fir, etc., may be finished so they are as beautiful as hardwood. Its brings out the beauty of the grain without raising it in the slightest.

Johnson's Wood Dye is a ***dye*** in every sense of the word. It contains no finish whatsoever and, like most first class products, it answers one purpose only—it dyes the wood—the finish must be applied over it. We recommended Johnson's Varnishes or Polishing Wax.

Johnson's Wood Dye goes on easily and quickly without lap or streak. It dries in four hours and will not rub off or smudge. You will find Johnson's Wood Dye a big help in working out color schemes in stained woods. Johnson's Wood Dye is made in 15 beautiful shades, all of which may be lightened, darkened or intermixed. Full directions on the label.

FREE—This Book on Wood Finishing

It's the best book ever published on Artistic Wood Finishing—the work of the famous experts—illustrated in color. This book is written for the practical man—it gives covering capacity, includes color charts, etc. We will gladly send it free and postpaid. Use coupon at right.



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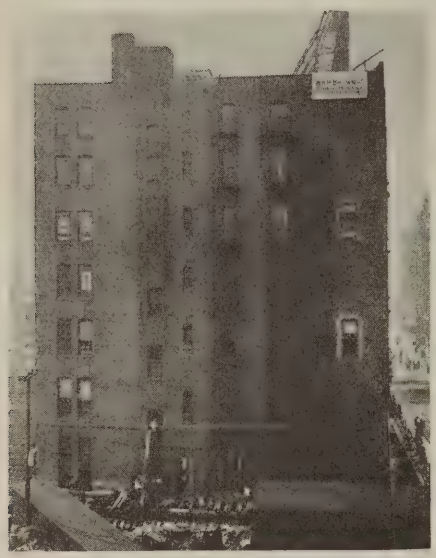

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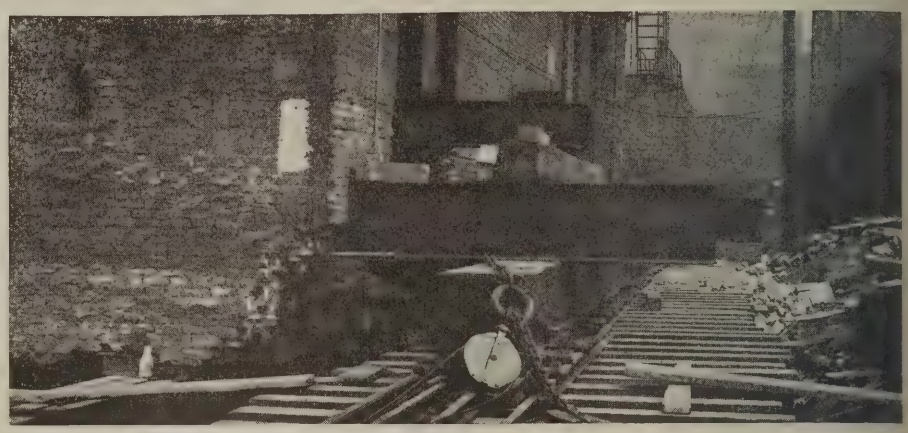

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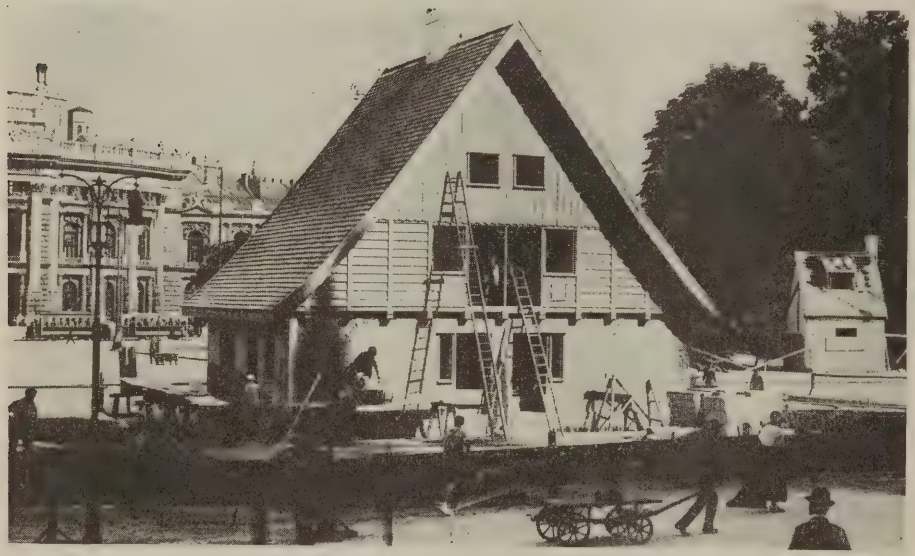
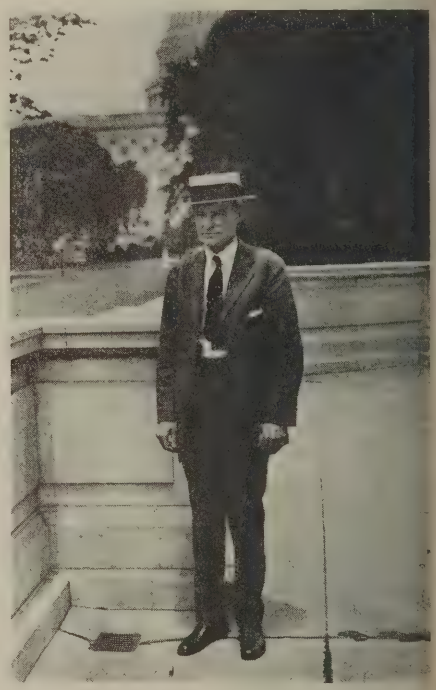
A new record is expected to be established when the Illinois Central railroad completes the moving of a large office building located at Roosevelt Road and Michigan Avenue, Chicago. The building will be moved about 90 feet south and one foot west and placed on a new concrete foundation. The weight of the building is 8000 tons, and the building is 80 feet wide by 130 feet long, seven stories in height and of brick construction. The picture on the left shows the building being moved; the picture above shows some of the steel beams, 90 feet long, which are used to move this office building



© P. & A. Photo

The housing problem for the workmen of Vienna, Austria, is being solved! The Vienna council has authorized the building of houses such as the one shown in this photo and others at a cost of about $500. The money is paid in small installments so as not to embarrass the purchaser who has full title to the house when the last payment is made. This photo shows a model house for workmen being built in Vienna in the square before the former royal palace



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David Lynn, former civil engineer at the Capitol, has been named by President Coolidge as the architect of the Capitol, succeeding Elliott Woods, former architect, who died a few months ago. Mr. Lynn has been connected with the Capitol for a number of years and was declared to be the logical man for the post

© P. & A. Photo

Something new in bungalow equipment in California is this outdoor barbecue oven built by James Cruze, motion picture director, as part of a new Hollywood home he has just completed. Some of the Indians that Cruze used in making his famous "Covered Wagon" film showed him how fine barbecued meat is, and Cruze immediately hustled home and had this oven built

The "American Universal Way"

Will earn for you just—

Six men's pay

TIME BOOK

NAMES	Rate per Day	AMOUNT Dolls.	Cts
D. Reuter	8.00	8	00
C. Novak	8.00	8	00
A. Moran	8.00	8	00
F. Malloy	8.00	8	00
G. Clark	8.00	8	00
R. Duncan	8.00	8	00
		48	00

TIME BOOK

NAMES	Rate per Day	AMOUNT Dolls.	Cts.
J. Morris	6.40	6	40
Operating Expenses:			
Garnet paper			60
Electric power		1	00
		8	00

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Hand scraping is slow and expensive—and the results are unsatisfactory. The "American Universal" machine, electrically driven, full ball bearing construction, will replace six men on your payroll. Leaves a beautiful, smooth surface—a much better job at one-sixth the cost. Edge roller feature makes it possible to surface right up to base board.

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For the Builders' Library

"Interior Wiring and Systems for Electric Light and Power Service," a manual of practice for electrical workers, contractors, architects and schools, by Arthur L. Cook. This useful little book is larger than it looks. It contains 458 pages, 4¼x7¼ inches, and contains over 250 illustrations. It is bound in flexible imitation leather covers and is sent postpaid for $3.00. It is a guide to modern practice in electric lighting and power applications, and in the design and installation of the wiring for such purposes. The book is designed for practical men as well as students and teachers. It gives in a simple and direct way rules for determining the size and arrangement of lighting units, and for estimating the sizes of motors required for various kinds of service. Tables are included giving definite information on the various problems involved in lighting and power applications and save long computations. This volume is the second edition of the book, which has been thoroughly revised. The author has incorporated the latest changes in the National Electric Code rules, the most important of which are in the overload protection of motors, approval of the use of varnished cloth insulating for wires, and of renewable fuses and changes in the requirements for the grounding of circuits. The sections dealing with tungsten and mercury-vapor lamps have been entirely rewritten to include recent developments. More attention has been paid to the subject of safety-type switches and panel boards, because of the very common use of this kind of equipment. Important changes have also been made in a number of the tables. A pamphlet containing answers to the problems in the book is published separately and sells for 25 cents. The manual is published by John Wiley & Sons, Inc., 432 Fourth Ave., New York City.

"Kiln Drying Handbook," by Rolf Thelen, in charge, section of timber physics, Forest Products Laboratory. This is bulletin No. 1136 of the United States Department of Agriculture, and is the latest publication of the Laboratory on the kiln drying of wood. "The principal purpose of this bulletin is to present to the dry-kiln operator, in condensed and convenient form, the fundamental facts about the drying of wood which he must know in order to get the most satisfactory results with his kiln. The major portion of the bulletin deals with the kiln drying of lumber, but there are also included specific suggestions concerning the drying of other forms of wood. The general information is applicable to all kinds of drying." The bulletin is 5¾x9 in size, contains 64 pages and is bound in paper. It can be obtained direct from the Forest Products Laboratory, Madison, Wis.

"Practical Perspective," by Frank Richards and Fred H. Collins—Shows just how to make all kinds of mechanical drawings in the only practical perspective isometric, making everything plain so that any mechanic can understand a sketch or

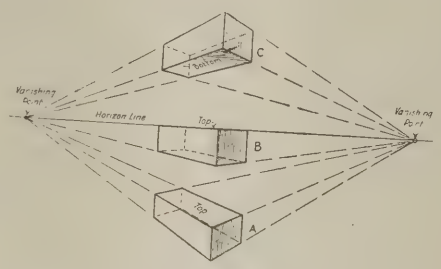


Fig. 67—From "Elementary Principles of True Perspectives"

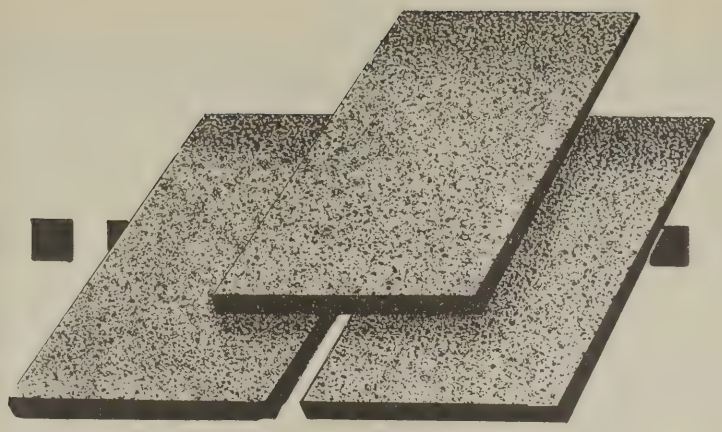
drawing in this way. Saves time in drawing and mistakes in construction. Contains practical examples of various classes of work. Fifth edition, revised and enlarged. Bound in limp cloth; 69 pages; size 4½x7; price $1; The Norman W. Henley Publishing Co., 2 West 45th street, New York, publishers.

"Southern Pine Barns and How to Build Them" is the title of a new book just published by the Southern Pine Association, with headquarters in New Orleans, and which now is ready for distribution. This book contains the designs and complete detailed plans of 10 up-to-date, economical and serviceable barns of the most popular types, attractive in design and calculated to be of the greatest practical service. The plans may be used for dairy, horse, beef cattle, or general purpose barns and they include small, medium and large-size barns, which may be built any length desired. Successful and practical builders wrote and illustrated this book for the purpose of simplifying barn construction and the detailed drawings accompanying each design include elevations, framework, cross sections and set forth every feature or step in construction. Comprehensive instructions and descriptive text accompany each design and set of plans in the book. All lumber for each of the 10 designs of barns shown is specified and the plans to provide for the use of lumber of standard sizes and lengths which is available in proper quantities at retail lumber yards everywhere, will insure building the barns with the least possible waste of materials. Also provision has been made in all the barn designs for use by the builder of a percentage of short lengths of lumber and no large or heavy timbers, which makes it easy for the farmer to build economically and with a minimum of assistance. The price is $1.00, postage prepaid.

"Furniture for the Craftsman," by Paul D. Otter. This book is a manual for the student and mechanic covering the design, construction and finishing of practically all the articles used in the furnishing and equipment of the modern home, porch and grounds, with hints on upholstering. The text is illustrated by numerous line drawings. There are 318 pages, with index, and the book is 6x9 inches in size. It is bound in cloth board covers and is published by the U. P. C. Book Company, Inc., 239 West 39th Street, New York City. The present volume is the second edition.

"Fire-Stopping in Dwelling Construction" is the title of the latest publication in the fire prevention series of pamphlets by the National Lumber Manufacturers' Association, International building, Washington, D. C., and Conway building, Chicago. It contains 12 pages and is 8½x11 in size. Diagrams for fire stopping at different points in buildings of frame construction illustrate the text. This is a booklet that every contractor, architect and builder should study diligently and then apply its recommendations so as to help cut down the annual loss by fire.

"Designs for a Rural Library Building." This is the title of Number 4 of Volume IX of the White Pine series of architectural monographs. It is a report of the jury of award of the eighth annual White Pine architectural competition. Designs and plans for the ten rural library buildings receiving prizes or honorable mention in this competition are reproduced, together with the jury's comment on them. Some designs of exquisite beauty are shown in this book and it is to be hoped that many of them will actually be built. The first prize design was submitted by Richard M. Powers and Albert C. MacLellan, Boston, Mass.



Every Fair Day Now is a Day of Grace

Trying weather for your roof is just ahead. Will it stand the winter winds that pull and tug at every shingle, the driving rain and snow that find every crack, the sparks that fall from roaring chimneys?

If you are the least bit doubtful about your present roof, put on a new one now. There is still time. Write us today about the roof of no more trouble and of greatest economy—

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These shingles are beautiful enough for any mansion. Economical enough for barn or garage. There's beauty as well as wear in the heavy butts, for they give the heavy shadow lines that make an attractive roof.

Do the colors of slate and tile appeal to you? Winthrop Tapers are DEEPLY coated with non-fading crushed slate, in colors of tile-red, sea-green, blue-black. With Winthrops you can have a roof of one color, or the mottled roofs that never lose their beauty.

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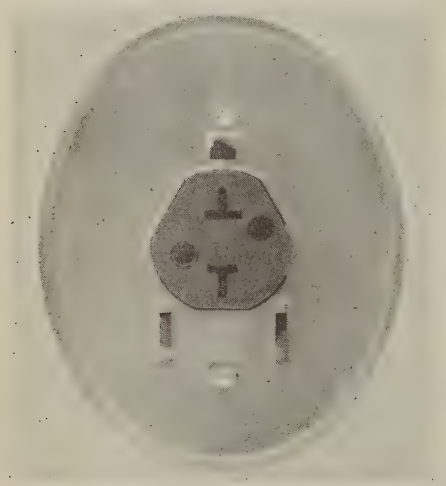
Among the Manufacturers

New Devices Methods and Improvements in the Building Industry

Elexits Are a Real Aid to the Builder

OFTEN the sale of a house is made because the living room has a window seat, the dining room has casement windows, or because there are built-in bookcases or a broom closet or some other feature of the kind that costs but little in comparison with other items of expenditure, but appeals strongly to the buyer.

"Elexits" provide a means of attaching or detaching lighting fixtures with no more difficulty or work, it is claimed, than is involved in hanging or taking down a picture, and these are recommended as an item that may be added to the list of sale-promoting features of the kind mentioned.



Elexit with wall plate

The term Elexits, it is explained, covers only the Elexit outlet and attaching device. It is not the name of any type, design or make of lighting fixtures. Elexits are made by various electrical manufacturing concerns and applied to any number of different kinds, styles and makes of fixtures.

They offer the builder a solution for a problem that is sometimes difficult. The public has been inclined to expect lighting units as a part of the equipment of the house, and perhaps to be prejudiced against one that is not furnished with them.

Yet if the builder installs them, the design or the arrangement may not suit the prospective purchaser. The glassware may not harmonize with his rugs or furniture, and he may have decided ideas as to the relative desirability of direct, indirect or semi-indirect lighting. Parenthetically it may be said that the public is being educated rapidly on the subject of lighting and is learning what constitutes desirable and satisfactory lighting units.

If the builder has installed fixtures, taking them down and replacing them with others, means work and expense. With Elexits any number of changes can be made without difficulty and with no expense.

Weight of man weighing 200 pounds suspended from Elexit

To be able to tell a prospect that the lighting system is so arranged that wall lamps and ceiling fixtures may be taken from room to room and attached and detached as easily as a portable or floor lamp is to introduce a strong and novel selling point.

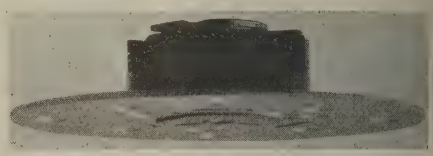
Among other benefits, Elexits make rearrangement of furniture a simple proposition. Ordinarily the furniture must be placed with reference to the lighting units to a certain extent. The fixtures are permanently installed and their location cannot be changed without trouble and expense. The furniture must be arranged with this fact in mind. In the house equipped with Elexits the furniture may be placed where desired, and the lighting units arranged afterward to conform to the scheme. In fact, Elexits take lighting fixtures out of the class of house devices and items of equipment whose location is fixed—as faucets, for example—and puts them in the class of those whose location is optional, as pictures, which may be placed to the best advantage and changed to suit varying requirements.

The Elexit idea appeals to the far-seeing and alert builder for three reasons:

It adds the selling point of a distinct, quickly appreciated and eminently practical feature to the house thus equipped. And features, as stated, are very often the points upon which sales turn.

It means that the house equipped with Elexits to-day will be up-to-date tomorrow; for the houses built tomorrow will be furnished with them as a matter of course. The saleability and the price of to-day's house, tomorrow and the day after tomorrow is an essential factor in every builder's plans.

It means eventually freeing him from the



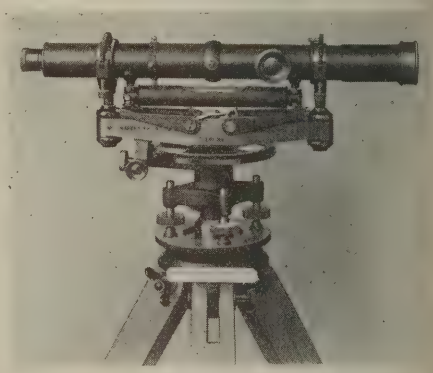
Elexit

necessity of including fixtures as part of the equipment of the house.

Elexits are not fads or fancies. They are common sense embodiments of an idea on which lighting fixture experts have been working for a long time.

Level Convertible into Transit

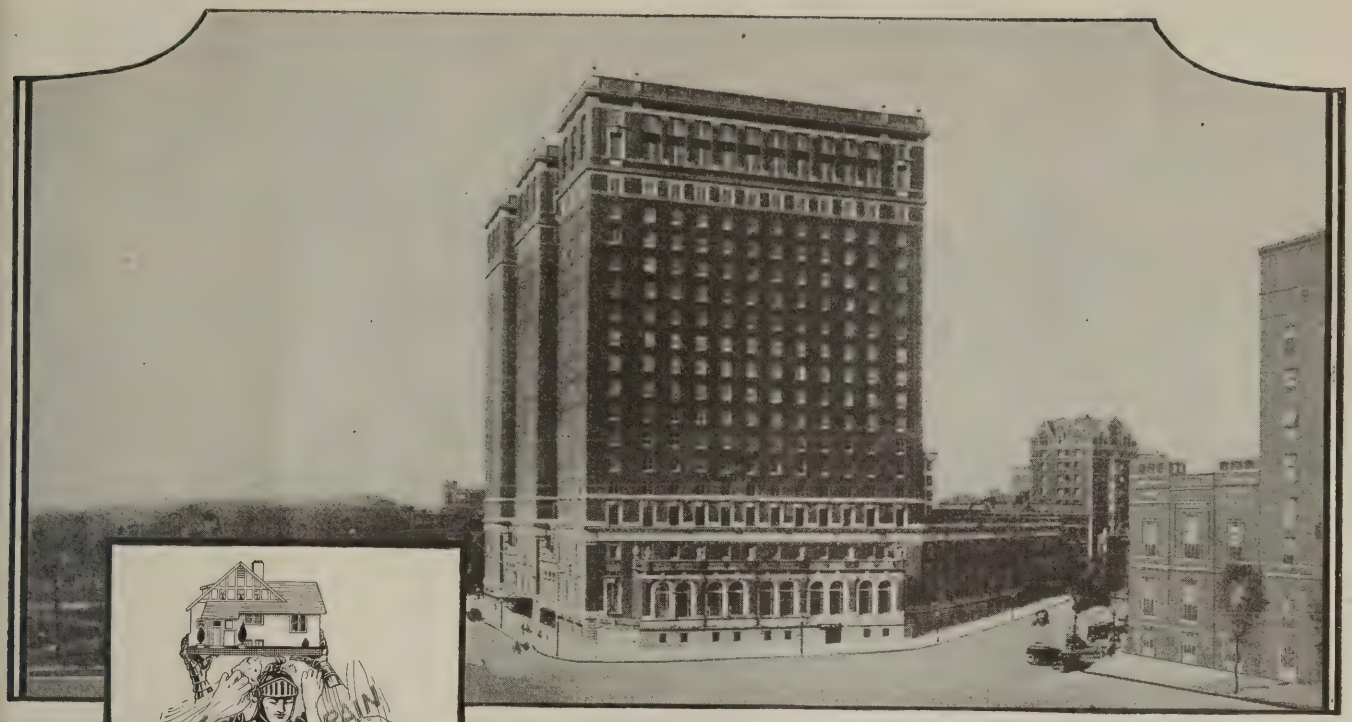
THE Warren-Knight Company, 136 North Twelfth Street, Philadelphia, have recently announced a new model, No.



Model No. 40 "Sterling" level manufactured by the Warren-Knight Company

40 "Sterling" convertible level, which can easily be changed to a transit without the use of detachable parts.

The manufacturers claim that this instrument combines accuracy, strength and durability and is so designed that it can be converted from a level to a transit in ten seconds, and back again as quickly, without throwing the instrument out of level.



New Hotel Statler, Buffalo; Architects, Geo. B. Post & Son; Contractors, Masten Construction Company

Hotel Statler Builders Specify GF Waterproofings

A Few GF Waterproofing Materials

GF Integral Waterproofing Paste (GF 10)
Mixed with the gauging water to waterproof mass concrete.

GF Membrane Materials
For walls and surfaces under hydrostatic pressure.

GF Colorless Waterproofing (GF 100)
A brush coating for waterproofing concrete, stucco and masonry surfaces.

GF Dampproofing Coating (GF 200)
A brush treatment for masonry surfaces to be plastered.

GF Mastic Cement (GF 250)
A plastic waterproof cement.

GF Crystalrox (GF 145)
For hardening and dust-proofing new and old concrete floors.

GF Cement Accelerator (GF 12)
Quickens setting of cement and prevents freezing of mixture.

In the construction of the new Hotel Statler at Buffalo, 26,000 pounds of GF Integral Waterproofing Paste (GF 10) were used in the foundation footings.

Its builders realized the importance of permanent, waterproof concrete. After careful examination, they found GF 10 the most able waterproofing agent.

The action of the paste, dissolved in the mixing water, makes a strong, nonporous, uniform structure, inherently waterproof.

The original cost of GF 10 is small—and there are no added labor or supervision details.

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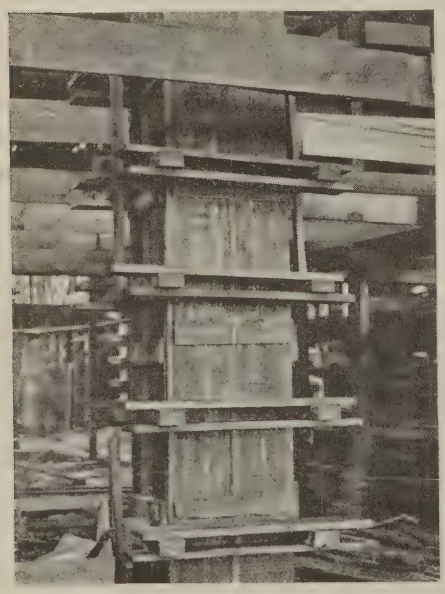
New Steel Clamp for Column Forms Saves Time and Money

IN the construction of the new sixteen-story office building for the Matson Navigation Company, at Main and Market Streets, San Francisco, a new type of adjustable steel clamp was used for holding the column forms while pouring the concrete fireproofing. The clamp proved so successful that its originators have patented it under the name of the Wedge Notch Form Clamp.

By using the steel clamps, the usual wooden collars for holding the column forms were eliminated. According to the Lindgren Company, the general contractors, this represented a direct saving of about $1500. A further economy resulted from being able to fill the column forms from bottom to top as fast as the concrete could be dumped from the buggies, the surrounding slab being poured as soon as the column form was full. The runways for the buggies moved back as the pour advanced and each succeeding column was filled as it was approached. This method cut down the number of runways required on the floor at any one time, besides saving considerable labor in shifting them about.

When wooden clamps are used, the column forms are usually filled to a height of about six feet, sufficient time allowed to elapse for the concrete to take a partial set, then six feet more added until the form is full. This method prevents the pressure from the wet concrete becoming great enough to cause the wooden clamps to fail, but it necessitates making a partial pour into all the columns, then going back over them again two or three times. This causes delay and confusion.

The adjustable steel column clamp consists of two pairs of intersecting arms 3 feet long and two 8-inch wedges. Each pair of arms consists of one double bar (two pieces 2½x3/16 inches), and one single bar (one piece 2½x5/16 inches). The single bar is held between the double bar by a ½-inch loose rivet which is secured by a cotter pin. (If a bolt were used, the threads would rust and become filled with cement.) The double bar is held together at the center and at the other end by countersunk rivets, a ⅜-inch washer keeping the bars in proper relation. The ends of the bars are notched, the notches being on the outside and set at an angle of 45 degrees with the longitudinal axis of the bar. The wedges are 8 inches long, ¼-inch thick, 2 inches wide at the top and taper to ¼-inch wide at the bottom. The complete clamp weighs 37 pounds, which is about the same weight as the wooden clamp it replaces.



Typical wooden clamps for column form

Clamping a column with the Wedge Notch column form clamp. The men climb on the clamps as they are set higher up the column

The column forms were made on the bench, of 1-inch boards, set up in place and held temporarily by nailing the edges of the panels together at the bottom, center and top. The first steel clamp was placed 9 inches from the floor and each succeeding clamp 18 inches above the last one set. To place the clamp, the single bar in each pair of arms was slid through the double bar in the opposing pair of arms until all four arms rested against the column form. The wedges were then inserted between the arms, engaged by the opposed notches and driven home with a hammer. Sufficient pressure was exerted by the wedges to draw the form boards tightly together and prevent any loss of grout. As the clamps were set higher up the column, the men climbed up on the clamps, hooking one knee over the projecting arm of the top clamp and resting the other foot on the clamp below.

Wedge Notch column form clamp set upon pegs to show the complete clamp

For an average throughout the job, two men clamped a column with seven clamps in twelve minutes, and one man stripped the seven clamps and piled them at the base of the column in four minutes, or one man clamped and stripped one clamp in four minutes.

The saving effected is seen by comparing this new device with a wooden clamp which usually consists of two pieces 2x4 and four pieces 1x6 each 3 feet long, held in place by 48 8d nails. With carpenters' wages at $8, laborers' at $5 per day of eight hours, and lumber at $30 per M foot, the following savings are evident:

ONE WOODEN CLAMP

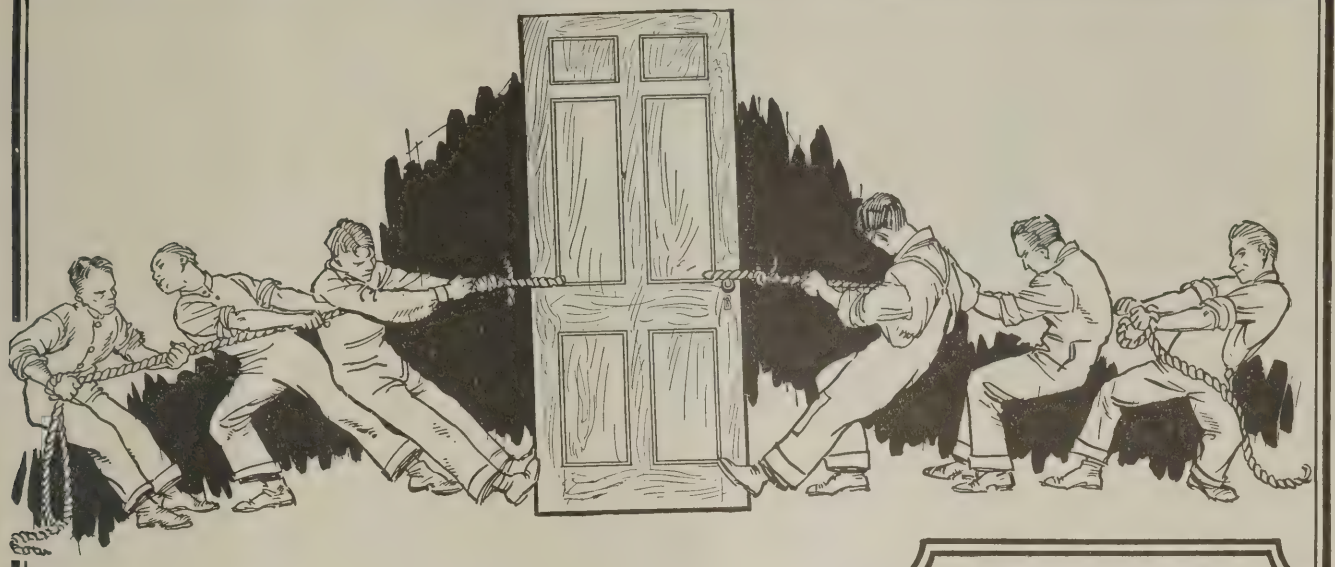
Material—10 bd. ft.@$30.00 per M	$0.30
Framing—10 bd. ft.@ 40.00 per M	.40
Stripping—10 bd. ft.@ 5.00 per M	.05
	$0.75

ONE STEEL CLAMP

Four minutes@1½ cents per minute	.06
Saving of steel clamp over wooden clamp	$0.69

"Building with Bonds"

NOT the least of the influences that make for good or poor business in the building industry is the matter of finance. It takes money to build, as every contractor, architect and builder knows. The American Bond & Mortgage Co., 127 N. Dearborn St., Chicago, and 345 Madison Ave., New York City, are important factors in the financing of buildings of all kinds. "Building With Bonds" is the title of a 32-page book, size 9⅜x12¾, which they have published for the prospective investor in real estate mortgage bonds. This book which is free will also interest the builder because of the information it contains about the financing of building operations.



It Takes a 2½ Ton Strain To Break a Curtis Door

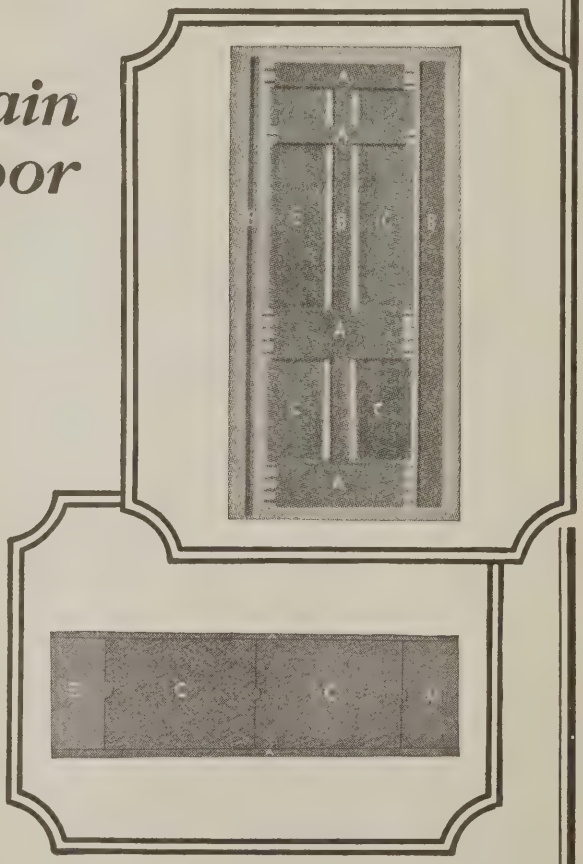
ALMOST "all the king's horses and all the king's men" are needed to break a Curtis door, so strongly is it put together. Straight-grained, flawless hardwood dowels join the stiles and rails together. The dowel is grooved to allow the air in the hole to come out and the glue to spread evenly. After a door is finished, it is machine sanded and reaches the job almost ready for the painter.

Both veneered and solid Curtis doors are equally well constructed and inspected. The trade-mark, shown at the bottom of the page, is stamped on the bottom.

All Curtis woodwork is turned out with the same refinement of manufacture and careful selection of lumber as these doors. Curtis Standardized Woodwork was all carefully designed by Trowbridge & Ackerman and will meet any architect's specifications.

Let us send you a copy of "Interior Doors and Trim". The miniature catalog will be a valuable aid to you in your selling.

The Curtis Companies Service Bureau
711 Curtis Building, Clinton, Iowa



In the above picture is shown a Curtis door before it is assembled by an automatic clamp. See the length of the hardwood dowels, insuring perfect joining.

The illustration below is a section of a hardwood door stile. A is a ⅛ inch strip of veneer. B is a ¾ inch hardwood edging strip. C is the white pine core. Note how the core blocks are tongued and grooved to hold in position. They are glued together.

Curtis Companies, Incorporated, Clinton, Iowa

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Curtis Door & Sash Co., Chicago, Ill.
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Curtis Woodwork is identified by the mark at the right. Whatever you buy—sash, door, molding, or interior woodwork—see that it bears this trademark. Curtis Woodwork is sold under the "1866 Curtis" trademark by retail lumbermen east of the Rockies.

1866 CURTIS

"We're not satisfied unless you are." Every month in the year the Curtis story is told to millions of readers in such magazines as: The Saturday Evening Post, Ladies Home Journal, American, House and Garden, House Beautiful, and Country Gentleman; also in Sweet's Catalog.

(2137)

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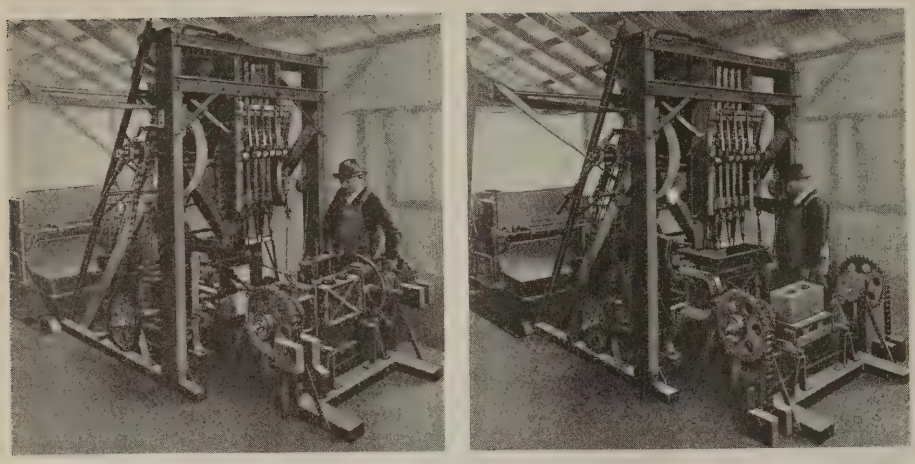


Two views of new roll-over stripper for making concrete blocks. Left, the mold box under the tamper and scraping hopper is forward over the box; right, after the block is stripped

New Roll-Over Stripper for Concrete Blocks

FOR the last two years, the Ideal Concrete Machinery Co., Cincinnati, state that they have been working to produce a machine that would make a good concrete block, make it fast, and at the same time keep away from the complication that is necessarily inherent in an automatic machine. The result of these efforts they announce in their new roll-over stripper. The feature of this machine is a carefully balanced mold box which rolls on a track between the feeder and tamper. The blocks are *not* made on the pallets, but are delivered to them when completed; and it is not necessary to stop the machine to wait for the block to be removed and empty pallets put in. The machine easily produces three blocks a minute and blocks of great solidity, it is claimed, due to the fact that the concrete is fed in gradually while the tamping is taking place, and thus the block, being a stripped product densely tamped all the way to the bottom, is waterproof on both faces.

New Catalog of Door Hangers and Hay Tools

CONTRACTORS and builders interested in the construction and equipment of farm buildings of all kinds will be interested in the catalog No. HT56, just published by the F. E. Myers & Brother Company, Ashland, Ohio. The book is 6x9 in size, contains 105 pages and is attractively bound in blue and brown imitation leather, heavily embossed and stamped in gold. The book lists their complete line of hay unloading tools, hay forks, steel tracks, pulleys, slings, hay rack clamps, door hangers, gate hangers, store ladders, bicycle stands, etc., and each item is priced with full description.

New Wallboard Made of Corn Cobs and Asphalt

"KOB-BOARD," a new wallboard, made of corn cobs, asphalt and paper, has recently been put on the market by the Kobbelite Company, 21st Street and Pennsylvania Railroad, Sharpsburg, Pennsylvania.

The board is manufactured of a composition which includes corn cobs in a ground state, the substance being rolled between paper, using asphalt of a very high melting point (over 300 degrees) as a binder. The result is a strong, durable board, which the makers claim is water and vermim proof and can be used for all purposes for which other boards are utilized. In addition, they say it is especially adaptable to the needs of building construction in moist climates or in damp places. It is also recommended for outside uses, in which case a waterproof paper is applied to one side of the board, thus making it impervious to the elements, although the paper of the regular product takes paint well with small absorption.

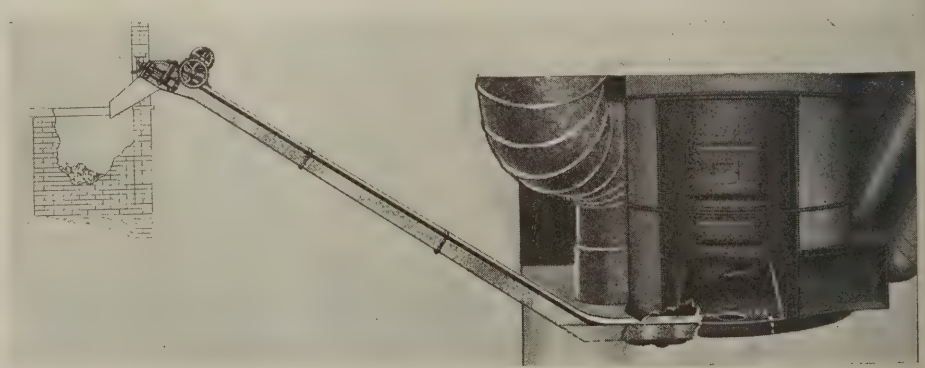
The raw materials used in the board, it is pointed out, are unlimited in supply, and using corn cobs the company is utilizing a by-product that has been practically waste heretofore from a manufacturing standpoint. The materials do not have to be treated in any way, other than grinding the cobs into a meal, and after the product is made no drying process for any length of time is required to put the material in a marketable shape, thirty minutes being all the time required between putting the cobs into the machinery and getting the finished products onto the shipping platform.

Handbook of the "B & B" Line

THE Bishop & Babcock Co., Cleveland have just published the first edition of a handbook on their heating specialties and ventilating equipment for all services. A complete index, on pink paper, in the back of the book, increases the usefulness of the catalog for reference purposes. The size of the book—4x7—and its flexible binding, make it useful to the man on the job. It contains scores of tables, covering every phase of heating and ventilating and many diagrams, drawings and half-tones of heating and ventilating equipment. The book has 278 pages.

Ash Conveyor for New or Old Homes

THE builder who suggests to his customer a way to avoid carrying out ashes makes a friend on the spot. A new device made by the Maroa Mfg. Co., Maroa, Ill., is an ash conveyor which can be installed in either new or old homes. It is operated by a 1/6-hp. motor set at the head of the conveyor. The operator switches on the electric current, then rakes the ashes into the hole seen in the bottom of the ash pit of the furnace. A continuous chain and drags passing from under the furnace, then up to the motor end, where the ashes and cinders are discharged into the outside ash pit, then back underneath the conveyor to the furnace, do the work. The spout that discharges the ashes into the outside ash receiver is made dust tight in connecting up with the outside ash receiver through its top. The conveyor is 7 in. high and 5 in. wide, and is constructed in sections which, it is claimed, are quickly assembled and bolted dust tight together. This device is sold through regular dealers in heating supplies.



Ash conveyor that can be installed in old or new house

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National Builder

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December 1923

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ONE WIPES DRY
PITTSBURGH ATLANTA

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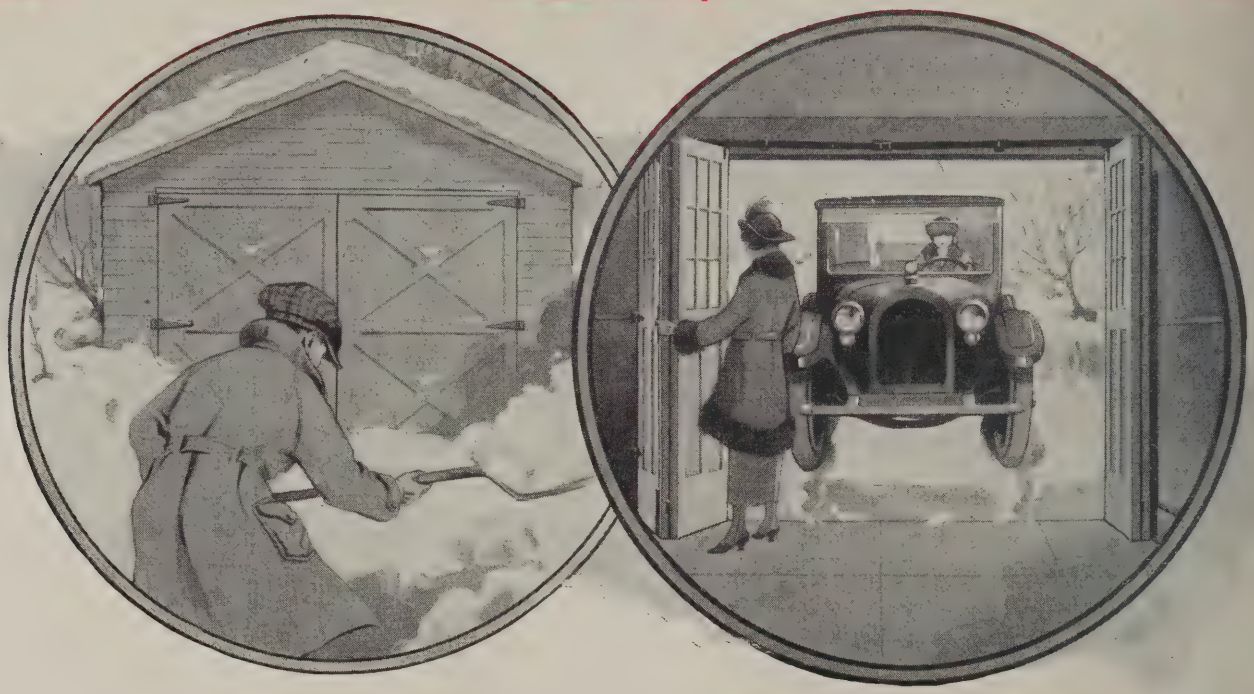
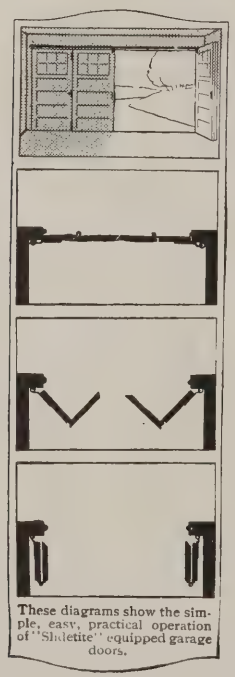


No Need to Dig In on a Cold Morning



These diagrams show the simple, easy, practical operation of "Slidetite" equipped garage doors.

Ever wake up late on a frosty morning and find the swinging doors to your garage blocked with drifted snow? Or struggle to open them in the face of a heavy gale? These are just two of the many troubles avoided when the doors of a garage are the sliding-folding type equipped with *"Slidetite."* You can understand, therefore, how much your clients will appreciate your calling their attention to—

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Slidetite equipped doors open and close with the least effort. They slide and fold inside—flat against the wall, leaving a wide, unobstructed opening. Cannot blow shut when open and are absolutely weather-tight when closed. It is a simple matter to change the doors of your present garage and equip them with *Slidetite* Garage Door Hardware.

Slidetite is the only practicable hardware for openings requiring more than six doors. Even in openings as wide as 30 feet, the doors will never stick or sag.

Our Catalog H-29 gives complete information about "Slidetite," and practical suggestions and illustrations for modern garage doorways. Write for it today. Your hardware or lumber dealer sells "Slidetite," or can obtain it from any of our many branches.

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Steel Casements You Can Afford

The window that has always been associated with the finest homes is now within the reach of all. Thru standardization and quantity production the price of Truscon Copper Steel Casements is so low as to compare favorably with ordinary wooden windows.

Their design gives 100% ventilation, added daylight, and greater usefulness from the same window opening. Their construction and the materials used assure long life, fire protection and freedom from repairs. Easily cleaned from within.

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Width of all units: 1′ 11⅜″.
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STANDARD CASEMENTS

National Builder

To Answer Your Questions—

JUDGING from the many letters we receive from our subscribers during the year, there is hardly a one who has not written us at one time or another asking where he can get this or that building material, accessory or equipment. We are always glad to answer these inquiries when possible and we want to receive more of them.

BUT to write us there is often a delay that you would like to avoid, and so in order to short-circuit these inquiries and to serve our readers better and more promptly, NATIONAL BUILDER is publishing as its principal feature in the January number a complete Directory and Buyers' Guide of practically every kind of material, accessory and equipment for the building field.

THIS Directory will be illustrated and the products briefly described. It will be a year 'round help to the contractor, architect, and builder and a valuable reference manual to sources of supply. Your January issue will be the most-thumbed number of the year next December.

OF course there will be other things in the January NATIONAL BUILDER, too—all the regular features, and besides them, articles on remodeling a garage building, on moving a stucco house without a single crack developing, and on other timely, helpful subjects.

BE sure you get your January copy of NATIONAL BUILDER!

A photo taken during alterations made on a garage building in Rhode Island. The complete story of how these alterations, which consisted of taking off the roof and adding three more stories, were made while business was carried on in the garage, will be told in the January National Builder

NATIONAL BUILDER is a journal for the contractor, architect and builder. It is published on the first of each month by the Tradepress Publishing Corporation, 542 South Dearborn Street, Chicago, Ill., to whom all communications concerning subscriptions, contributions or advertising should be addressed.

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Contributions to the editorial pages will be accepted solely on their merits and paid for at the regular space rates. Contributions of timely nature must be in on the 15th of the month preceding date of issue.

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Mechanical Requirements: Type size of page, 7x10 in.; half-page, 3½x10 in. or 7x4⅞ in.; quarter-page, 3⅓x4⅞ in. or 7x2⅜ in.; eighth-page, 3⅓x2⅜ in. Screen required, 120 line; reversed plates must be stippled or Ben Day.

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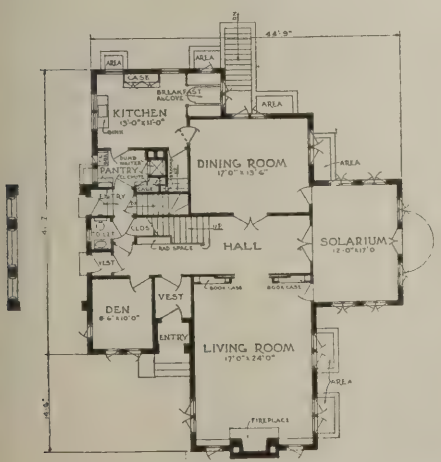
A slate roof, dark red mat-face brick laid in Flemish bond, with flush white mortar joints, a few arches, and white trim and muntins make an effective combination

PELLA is a town of about 3500 inhabitants in southeastern Iowa. It was settled nearly a century ago by a band of immigrants from Holland. They brought with them some Old World building ideas and some of their houses and other buildings are still standing and are charming in line and proportions. It is in this community where this "House of the Month" was recently completed. The owner is Mr. G. T. Vogelaar; Richard Lautenbach was the contractor; and Boyd & Moore, Des Moines, the architects.

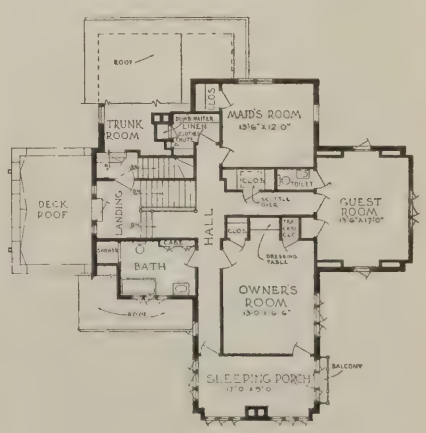
The house is a good example of the half-timber style. The brick work in the chimney and the overhanging portion of the second floor are interesting details. Stucco plaster in the gables and dormers and in the soffits beneath the overhanging eaves affords a pleasant contrast with the brick walls and slate roof.

There are two main entrances—from the front and from the drive. The kitchen entry is near the latter and provides easy access to the basement. The walls and floor of the kitchen are of tile, with white enameled fixtures. The solarium is connected with the dining room as well as the hall and living room. Upstairs, there is a guest room with its own toilet and a sleeping porch for the owner's room. The bath has both a shower and a tub, and its walls and floor are of tile.



First floor plan

A view of the solarium side of the house showing the arched windows in that room



Second floor plan

Looking from the end of the field toward the grandstand. Spectators are protected from foul balls by a mesh-wire screen

Athletic Field for a Town of Moderate Size

Grandstand of Woodruff Athletic Field at Peoria, Illinois, Offers Some Interesting Details of Stadium Construction

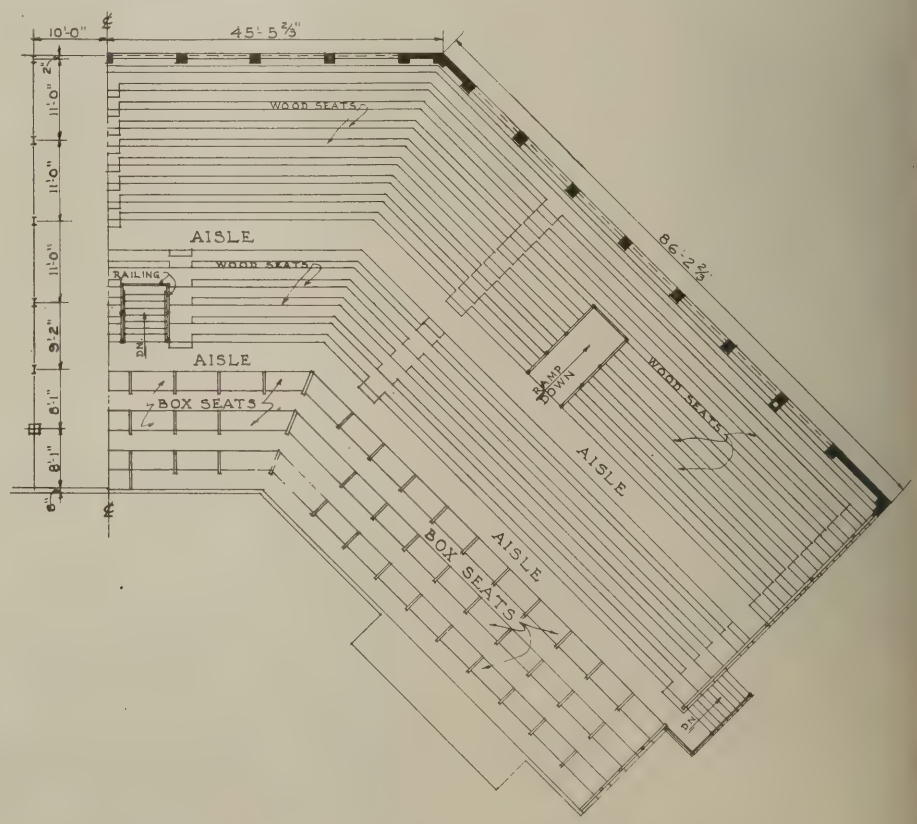
IT would seem that interest never wanes in baseball, a pastime which has come to be known as "our great national sport," and all over the country, in towns of any size, baseball fields are to be found. They range in size from the elaborate concrete and steel structures which seat a hundred thousand spectators to the small, fenced-in lots which contain wooden bench accommodations for only one or two hundred. Somewhere in between these two extremes is a happy medium and the writer believes that it is to be found in the design illustrated here.

This is the Woodruff Athletic Field, located at Peoria, Illinois, a town of about 112,000 population. The grandstand, which provides accommodations for approximately 4400 spectators, combines good design with economical construction and contains several points worthy of discussion.

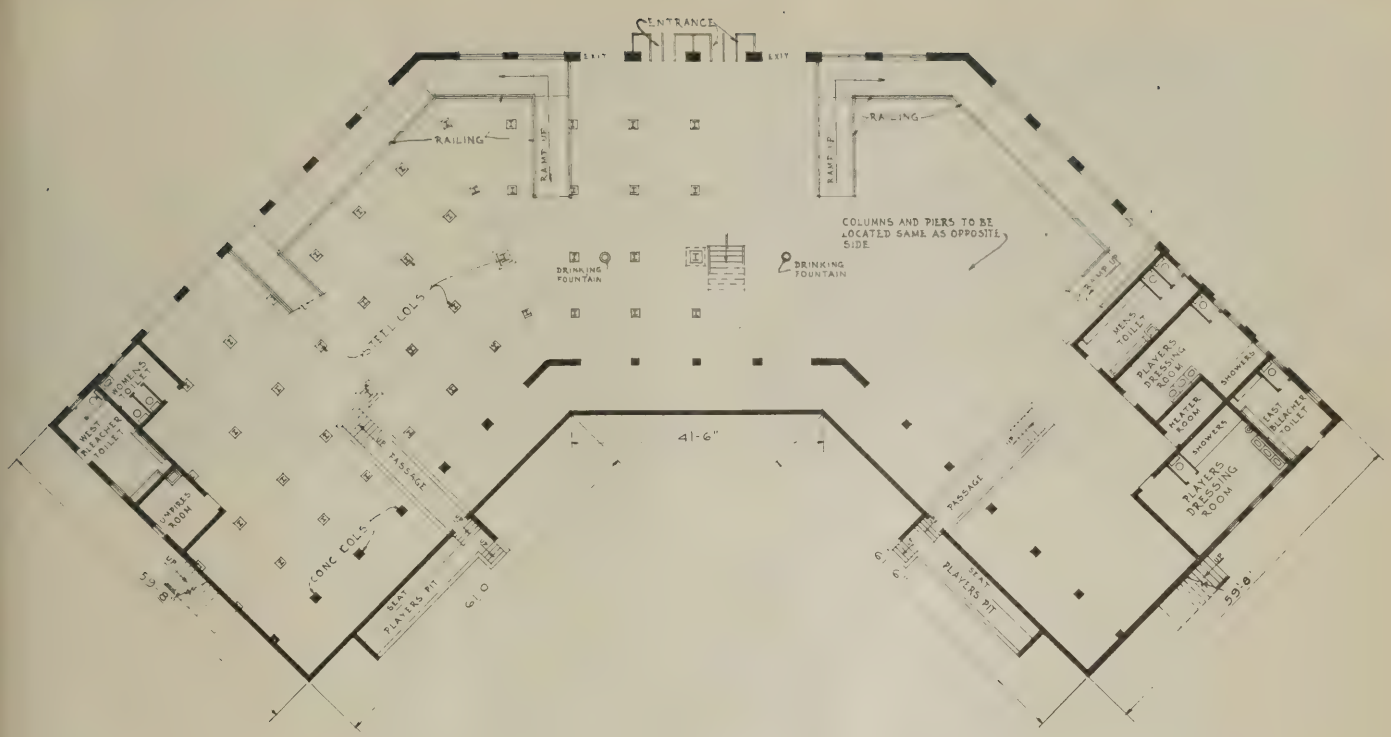
The stadium is built of reinforced concrete and steel, and the seating arrangement is supplemented with wood bleachers. The exterior walls of the grandstand are finished with red face brick and a poured-in-place concrete coping. Interior supporting columns, main girders, and the roof system are structural steel but the grandstand floor is a reinforced concrete slab arranged in steps.

Two players' dressing rooms, one for the home team and one for the visiting team are provided on one side of the grandstand and on the other side an umpire's room is located. Men's and women's toilets are located on opposite sides of the structure and additional toilet facilities are provided for the bleachers.

The grandstand seat design consists of small lengths of I-beams, held to the concrete floor by means of expansion bolts. Small pieces of joist are set on the I-beam



Plan showing seating arrangement. Notice the location of the exits which lead from the body of the grandstand to the ramp, and thence to the street



Ground floor plan showing layout of dressing rooms, etc. Notice ramps leading up to body of grandstand

flanges and the seats, which are made of 2x12 planks, rest on these blocks. The seat-planks are held firm by round-head bolts which run through the I-beam flange. These bolts project only a very small distance above the surface of the plank and so are

Detail showing design of grandstand seats

not liable to tear the spectators' clothes or interfere with their comfort.

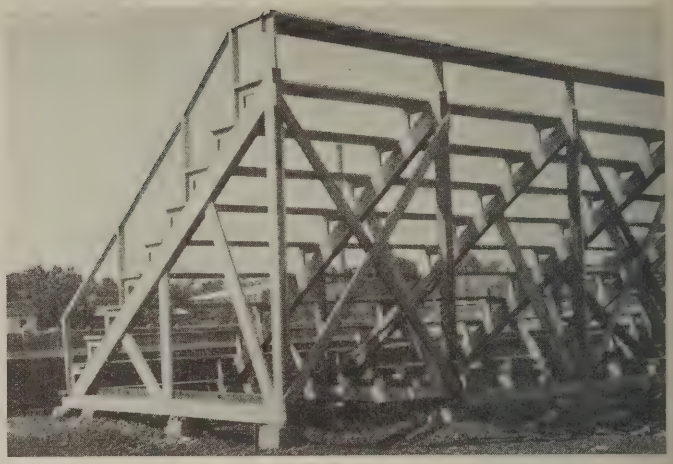
A feature of prime importance in grandstand design is the exit facilities, and a study of the plans and illustrations shown here will indicate that this factor has been well borne in mind by the designers. Five exits are provided in different portions of the grandstand as follows: Three in the body of the grandstand and one at each side wall. Ramps are used instead of stairways for the exits in the body of the grandstand, since these inclined planes provide more rapid exit facilities than stairways. For the two exits outside the grandstand, stairways are used due to the fact that if the field were used in the winter-time accidents might result due to ice collecting on the exposed ramps. It is easily seen that an ice-covered stairway is considerably easier to walk upon than an ice-covered ramp. Notice, in the diagram showing the seating arrangements, how naturally all aisles and passageways lead to the exits. According to the architects, this grand stand can be emptied of all spectators in three minutes.

The exits from the field to the street are six in number and consist of four 10-foot-wide gates in the center of the grandstand at the street, and one wider gate at each end of the grandstand, leading directly from the field to the street. These two gates provide exit facilities not only for that portion of the grandstand nearest the ends, but also for the bleachers, and their location makes it unnecessary for the bleacher spectators to pass through the grandstand on their way from the field to the street. All openings from the street to the grounds are barred wtih heavy iron gates, and to make these gates easy to open and shut, a small steel roller is fastened to the bottom of the gate at the free end. When the gate is moved this roller travels on the ground and keeps the gate in alignment, preventing its sagging and tearing the hinges from the walls.

In order to increase the seating capacity and at the same time provide seats which could be sold at moderate prices, "bleachers" were erected on each side of the grandstand. The center posts of these "bleachers" are built of three 2x10s, the central member being allowed to run above the other two in order to form a support for the railing at the top. The diagonal and bottom members, which carry the seats, consist of two 2x12s, and the 2x10 stiffener members which com-

Front view showing location of entrance and ticket offices

Ramp leading from body of grandstand to ground floor



View of bleachers. They are built of wood joists and rest on concrete piers

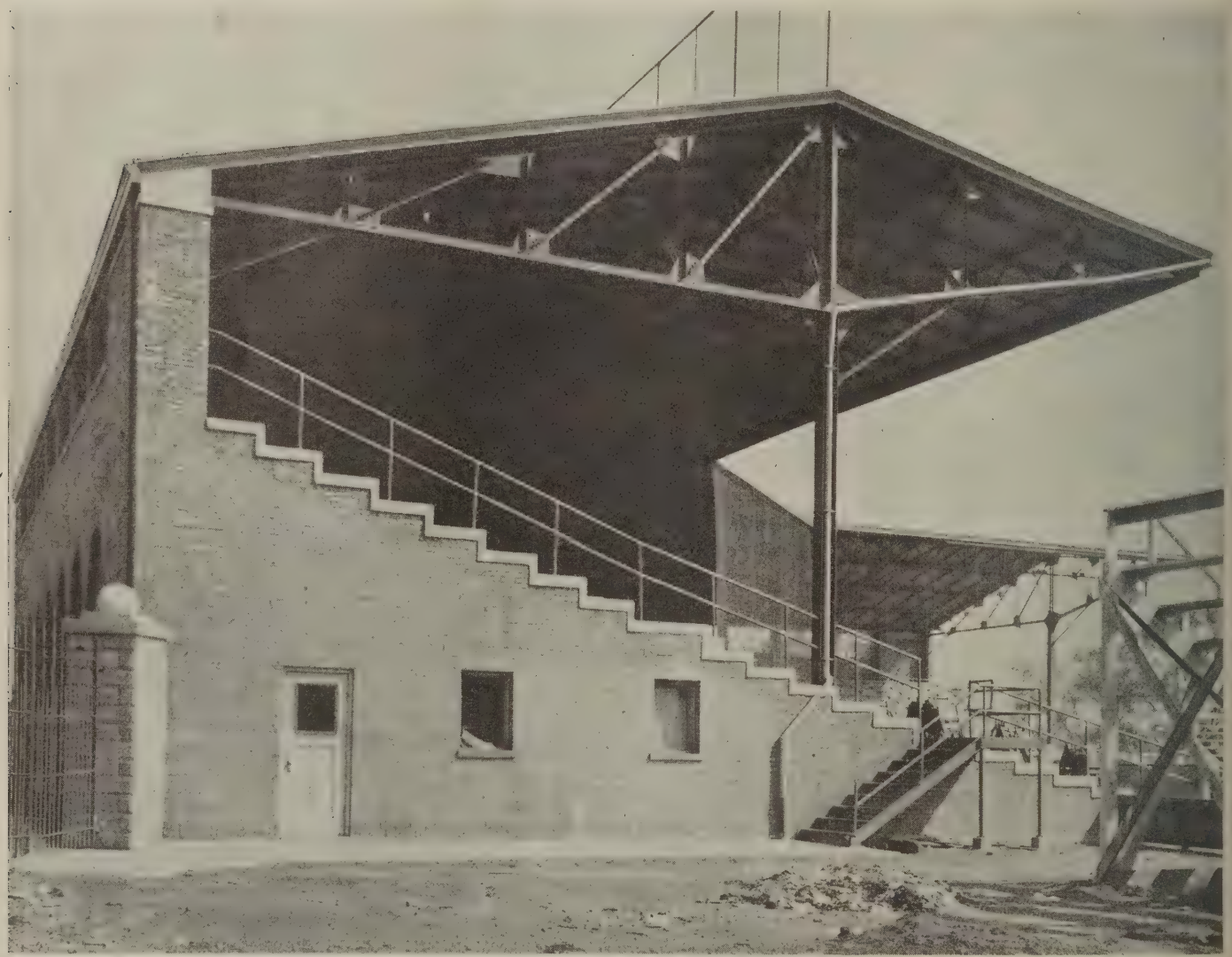
plete the truss are run between the two heavier pieces. The lateral bracing is 2x8 and the railings 2x4. The seats are formed of two 2x8s, thus providing a seat 16 inches wide. The whole arrangement is nothing more or less than a series of trusses stiffened with lateral bracing, and carried on concrete piers.

This arrangement is designed to accommodate five tiers of spectators.

The approximate seating capacities of the various units are as follows:

Boxes	522
Grandstand	1850
Bleachers	2000

Day and Bullard of Peoria, Illinois, were the architects and Val Jobst and Son, of the same city, were the general contractors.



Side view of grandstand showing one of the exits. Stairs are used instead of ramps because this exit is exposed, and as the field is sometimes used for winter sports, an exposed ramp would be liable to be covered with ice. An ice covered ramp would be more difficult to traverse than ice covered stairs, and would present a greater danger to people coming down

The Steel Square

III—How to Read It (Continued)

IN the last article of this series the hundredth scale, octagon scale, and Essex board measure scale were discussed. This article will treat with the brace measure scale, angle cuts for polygon table and the different rafter tables.

The brace measure scale is generally found along the center of the back of the tongue (Fig. 1) and is used to determine the length of common braces where the post and the beam are of equal length. For instance, if the run is 48 inches on the post and the same on the beam, the length of the brace will be 67 88/100 inches, as shown by the figures in the center of the tongue (Fig. 1) directly above 6½ on the inside edge, and as illustrated in Fig. 2. If the run is 60 inches on both beam and post, the length of the brace will be 84 85/100. The two equal figures set in a vertical line indicate the length of the beam and post and the figures to the left give the length of the brace in inches and hundredths.

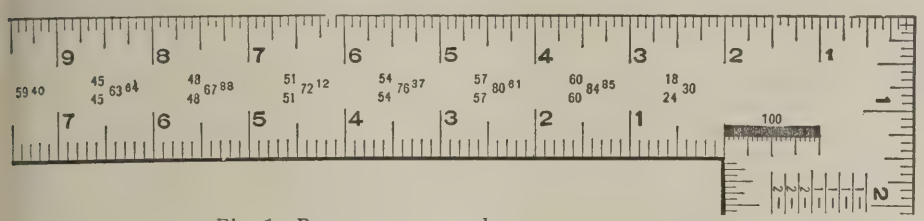


Fig. 1—Brace measure scale

The table of angle cuts for polygons shown here (Fig. 3) is in the center of the face of the tongue. It gives the cuts for pieces, which, when fitted together, will form the sides of a given polygon.

Suppose it were desired to lay out the sills for a pentagonal or five-sided figure such as a ticket seller's booth. In the center of the face of the tongue is found the following notation: Five SIDES 18-13⅛. This means that to lay out the cut for a figure of five even sides take 18 on the body and 13⅛ on the tongue, on the outside edge. Mark along the tongue as shown in Fig. 4 and saw five pieces of equal length having this angle cut at each end of the piece. These pieces, when fitted together, will make a five-sided figure whose size is dependent upon the length of the pieces cut.

The next to be considered will be the rafter tables. Before a description of these tables is attempted the various kinds of rafters will be defined. These rafters are shown in perspective in Fig. 5, and in plan in Fig. 7. All letters mentioned in the table of definitions below refer to Figs. 5 and 7.

The ridge (A) is a piece about 1 inch thick inserted between the rafters at the top.

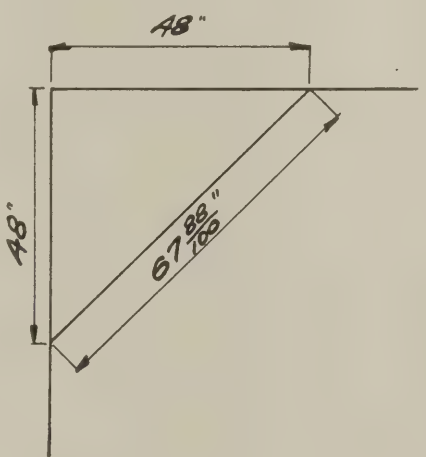


Fig. 2—Illustration of brace measure

The plate (B) is the horizontal piece upon which the rafters are supported.

Common rafters (C) extend from the plate (B) to the ridge (A) and are not connected to any other rafters.

Cripple rafters (D) are connected at both ends to a hip rafter (G) or a valley rafter (E) or run from the ridge (A) to a valley rafter. They do not have a footing on the plate (B) and are therefore, literally, without feet.

Jack rafters (F) do not extend from the plate (B) to the ridge (A), but are connected at one end to a hip rafter (G) or a valley rafter (E).

Hip rafters (G) are located at outside corners and are the opposite of valley rafters (E). They extend from the plate (B) to the ridge (A).

Valley rafters (E) are found at every inside corner. They are the opposite of hip rafters (G). They extend from the plate (B) to the ridge (A).

Other terms used in roof framing (see Fig. 6) are given below.

The Rise is the distance found in following a plumb-line from a point on the central line of the top of the ridge (A) to the level of the top of the plate (B).

The Run is the shortest horizontal distance from the plumb-line through the center of the ridge (A) to the outer edge of the plate (B). The run is always half of the outside width of the building.

The Pitch is the relation of the rise to twice the run or the relation of the rise to the width of the building. A roof of 4 feet rise on a building 24 feet wide is therefore a roof of one-sixth pitch. The run of this roof is one-half the width of the building, or 12 feet. Thus for each 12 inches of run the rise is 4 inches.

Rafter ends are cut to roof angles to rest respectively against the ridge and the plate. The cut against the ridge is called the top cut and the cut against the plate is called the bottom or heel cut. The points for making "top" and "bottom" cuts are found by placing the square upon the rafter so that a portion of one arm of the square represents the run and a portion of the other arm repesents the rise. Thus for common rafters 12 and 4 give one-sixth pitch (Fig. 8).

The hip rafter (G-Figs. 5 and 7) is the hypothenuse of a right-angle triangle, one side of which is the common rafter (C) and the other side that part of the plate (B) lying between the foot of the hip rafter (G) and the foot of the adjoining common rafter (C). The rise of the hip rafter is the same as the rise of the common rafter, and the run of the hip rafter

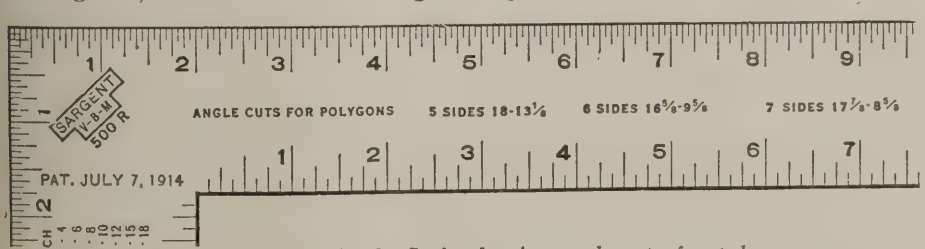


Fig. 3—Scale showing angle cuts for polygons

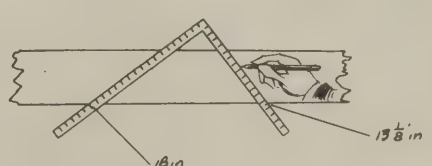


Fig. 4—Method for laying out angle cuts for polygons

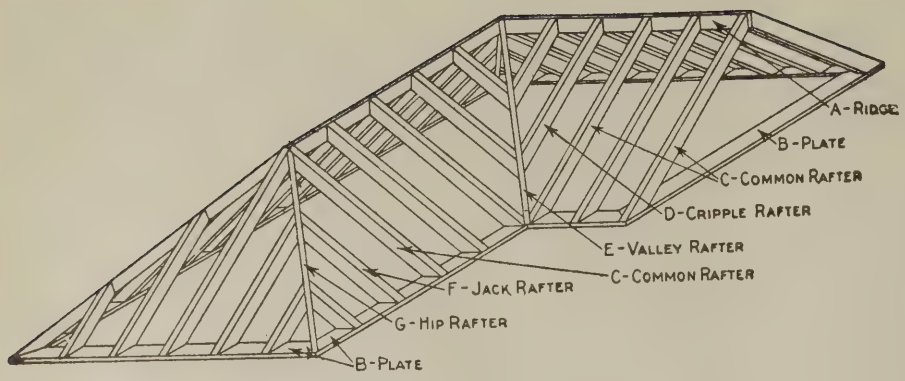


Fig. 5—Perspective illustrating various terms used in roof framing

is the horizontal distance from the plumb-line of its rise to the outside of the plate at the foot of the hip rafter. By calculating the right triangle for which the hip rafter is the hypothenuse, and assuming each leg to be equal to one unit, we find the hypothenuse equal to 1.41—the ratio of 1.41 to 1 is approximately as 17 is to 12. Therefore for one-sixth pitch the common rafter run and rise are 12 and 4, while the hip rafter run and rise are 17 and 4.

For the top and bottom cuts of the common rafter, the figures are used that represent the common rafter run and rise, that is, 12 and 4 for one-sixth pitch, 12 and 6 for one-quarter pitch, etc., but for top and bottom cuts of hip rafters use the figures 17 and 4, and 17 and 6, etc., the run and rise of the hip rafter.

The common rafter table is usually located on the back of the body of the square (Fig. 9). The table makes use of the graduations on the outside edge of both the body and the tongue. These graduations are in 12ths. The inch marks may be taken as inches or feet, and the twelfth marks may represent twelfths of an inch or twelfths of a foot, depending upon whether the scale assumed is for inches or feet. The graduations on the outer edge of the body of the square, directly above the table (Fig. 9), represent the run of the common rafter, and at the end of the table near the corner of the square, under the word pitch, are given the figures for various roof pitches. The two figures given first represent, respectively, the run and the rise, and the third figure gives the pitch. Thus, as shown on the third horizontal line, a roof having a run of 12 feet and a rise of 8 feet is a roof of one-third pitch, and as given in the sixth line, a roof of five-eighths pitch has a run of 12 feet and a rise of 15 feet. The lengths of rafters required will be found along the horizontal line for any pitch, directly under the graduation on the outside edge, which represents the run.

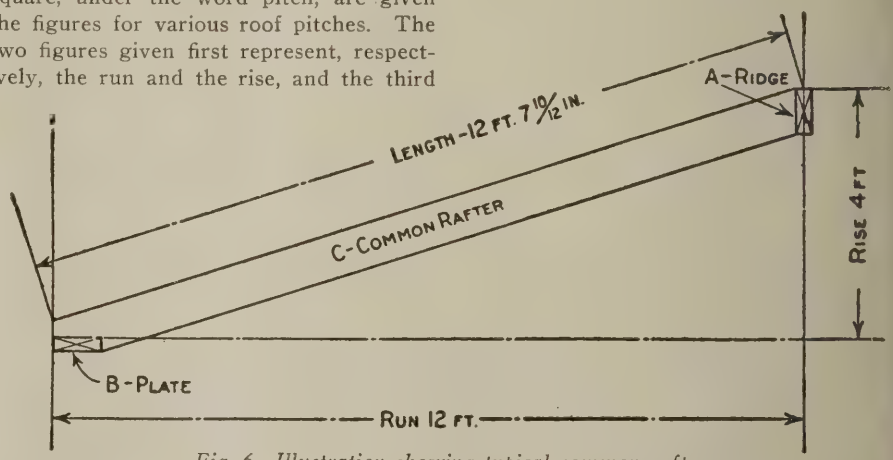


Fig. 6—Illustration showing typical common rafter

Suppose it is required to find the length of a common rafter for a roof of one-third pitch having a run of 9 feet. In the vertical column of figures giving the various pitches, one-third pitch is found in the third horizontal space from the top. Follow along this space to the figure 9 on the outer edge of the square, and in the third horizontal space from the top, under the figure 9, read 10-9-10 which is 10 feet 9 10/12 inches, the length of the common rafter.

In a similar manner, the common rafter for a one-fourth pitch roof (12 foot run to 6 foot rise) having a run of 13 feet, will be found to have a length of 14 feet 6 5/12 inches.

If the run of a rafter is greater than any figure given on the scale take two rafters of such runs as will form the run desired when added together, find the lengths of the common rafters, and the total of these lengths will give the length of the rafter required. Thus for a roof of one-third pitch with a run of 27 feet find the length of a rafter for a 14 foot run, which is 16 feet 10 inches, and add this to the length of a rafter for a 13 foot run, which is 15 feet 7 6/12 inches or 15 feet 7½ inches. Thus the length of a common rafter with a 27 foot run is equal to 32 feet 5½ inches, the sum of the two.

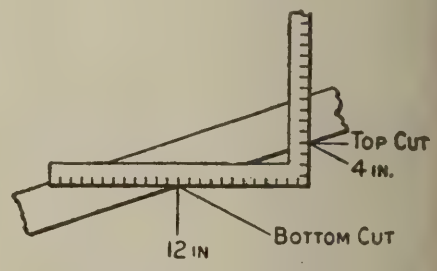


Fig. 8—Method of obtaining top and bottom cuts

If the run is given in inches instead of feet, the length of the common rafter is found in the same manner as before except that instead of reading feet and inches in the table, read inches and twelfths of an inch. Thus, if it is required to find the length of a common rafter for a roof having

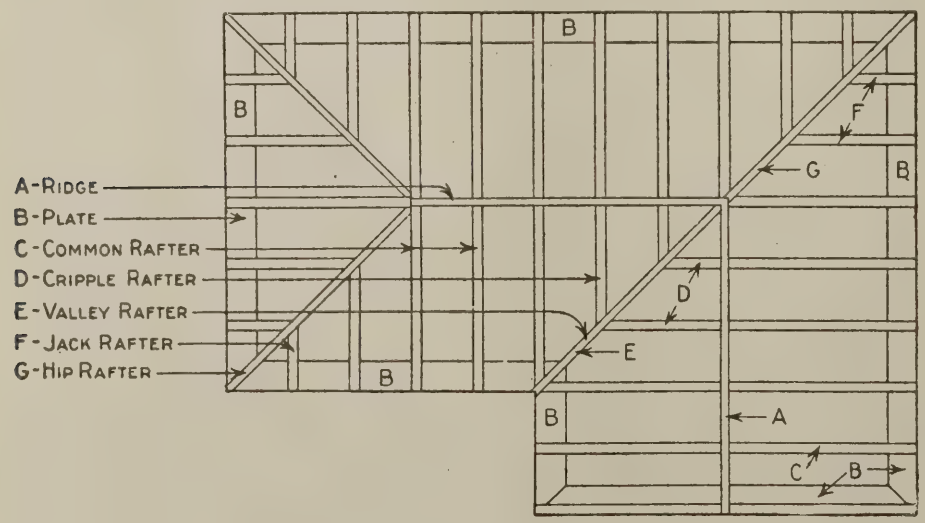


Fig. 7—Plan illustrating various terms used in roof framing

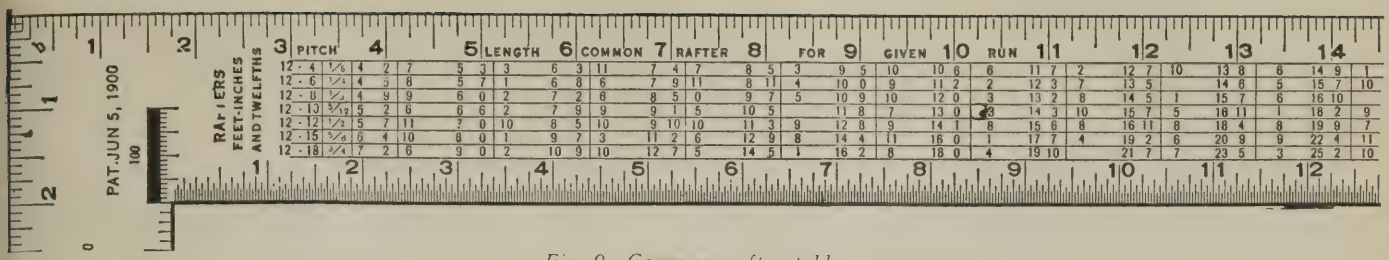


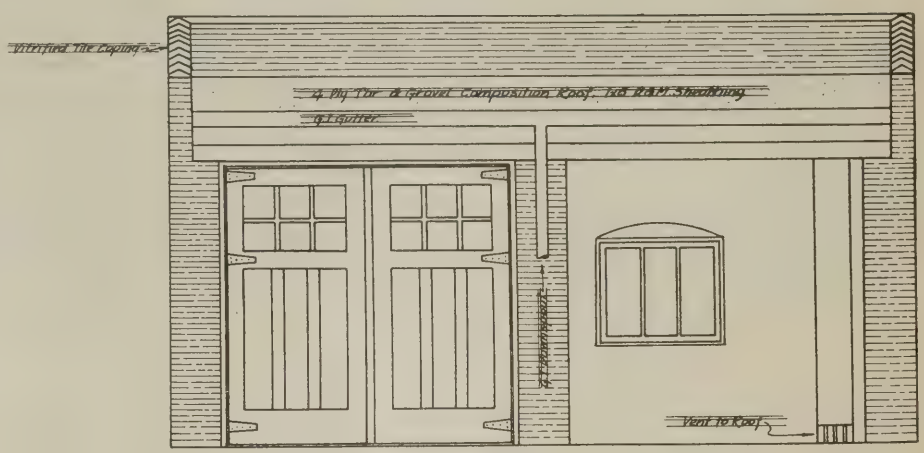
Fig. 9—Common rafter table

a one-sixth pitch and a run of 12 feet, 6 inches, find the length of rafter for the 12 foot run, reading feet and inches in the table, and add it to the length of rafter for a 6-inch run, reading inches and twelfths in the table. For a run of 12 feet the rafter length for a one-sixth pitch roof (Fig. 9) is 12 feet, 7 10/12 inches, and for a run of 6 inches the rafter length is 6 4/12 inches. Thus for a one-sixth pitch roof with a 12-foot, 6-inch run, the length of the common rafter is the sum of the two lengths already found or 13 feet, 2 2/12 inches.

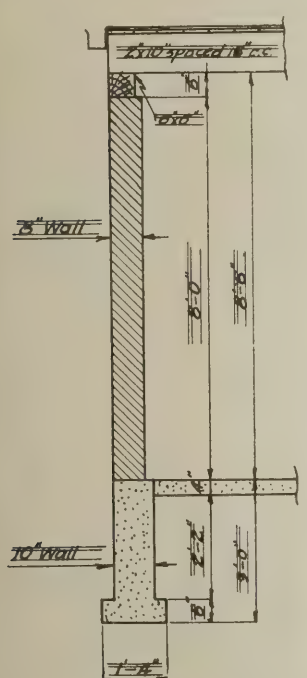
A Two-Car Garage

THIS garage can be built on the rear of any city lot and is so simple of construction that the cost is small. As it is designed for the rear of the lot, ornamentation is not required and a saving of cost is thereby effected. Common brick serves for the walls.

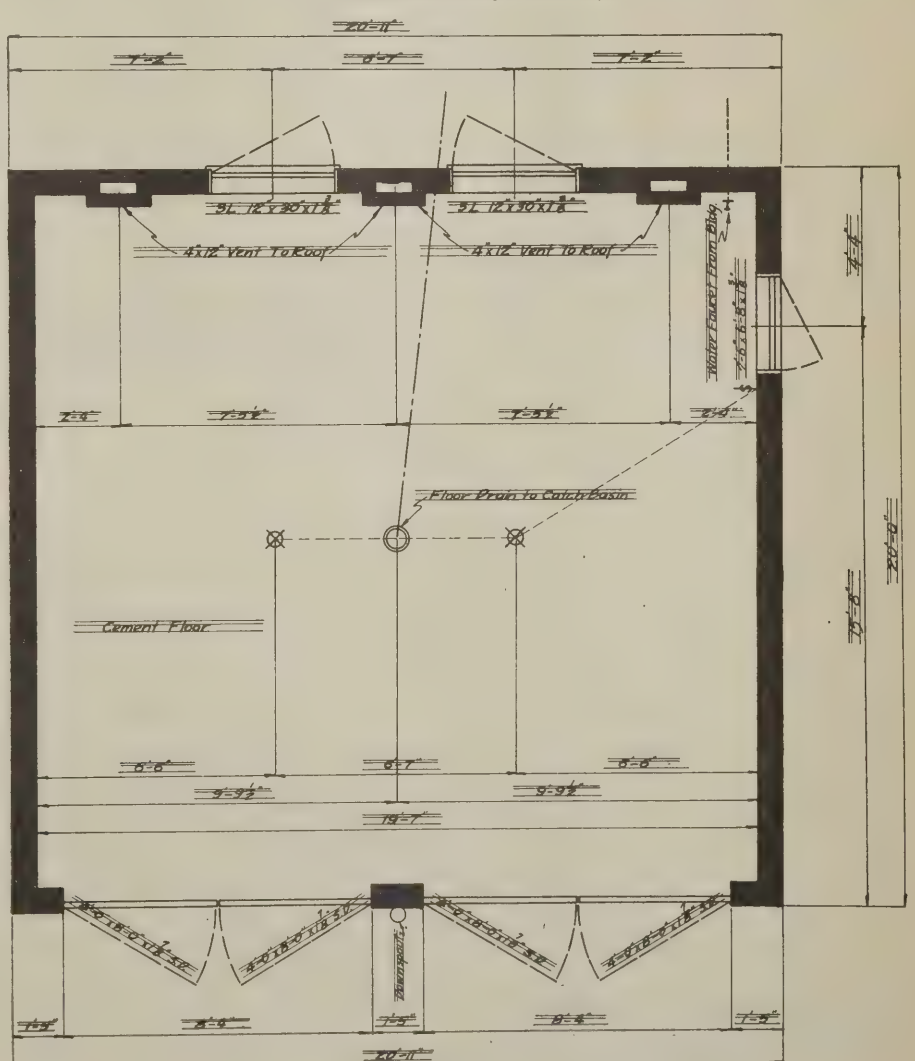
The garage is equipped with flues which have a lower opening near the floor and an exhaust in the parapet wall above the roof. These flues carry off the gases which arise from the exhaust of a running engine and their importance should not be underestimated.



The elevation is simple in design



Section. Common brick walls on concrete foundation



Floor plan. Note the flues for ventilation

The new clubhouse of the Centerville, Iowa, Country Club is built on a hill and can be seen from miles around, and occupants of its long, wide porches enjoy a view of the entire surrounding country as well as the golf course

An Inexpensive But Attractive Small Country Club House

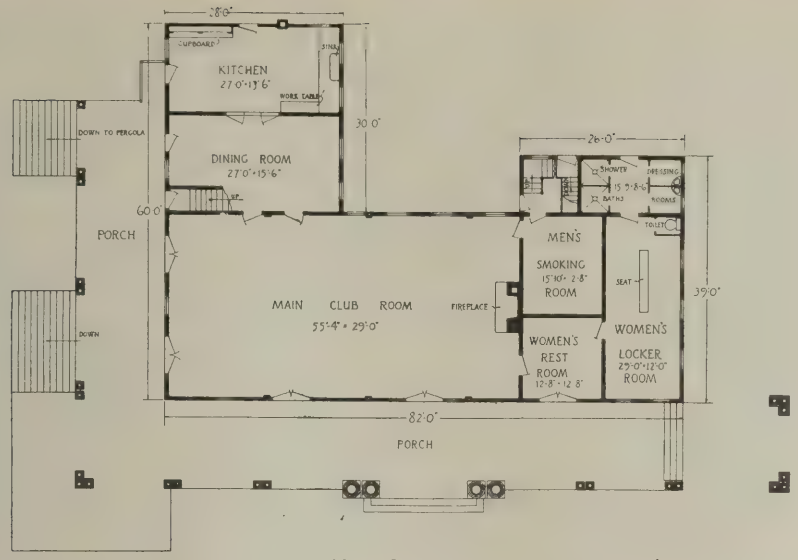
THIS is the time of the year when the building committee of many a small country club is talking about a new club house. With many clubs this is as far as they get. Others find a good builder, get his ideas, take the bull by the horns, so to speak, and actually build.

That is what happened in Centerville, Iowa, a town of some 8500 inhabitants, and the results are shown in the photographs and plans on these two pages in the hope that other country clubs will be encouraged to go and do likewise. The right kind of builder or architect can do a great deal to crystallize the building intentions of his local club and get the building committee down to brass tacks, particularly when he has something definite to show them.

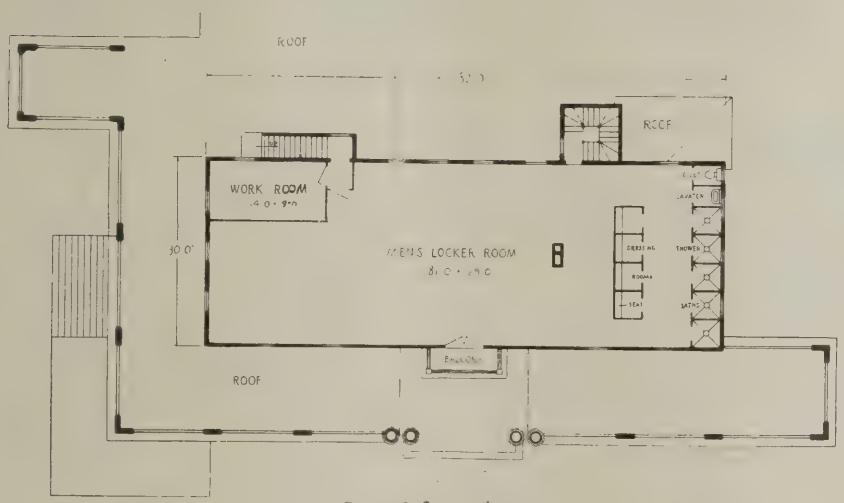
The old clubhouse has been preserved as a dance pavilion and is connected with the new building by a latticed pergola

It must be confessed that the Centerville Country Club had a big advantage in getting their club house construction under way, for they had the services of V. A. Banta, a local architect and builder. Banta has had a wide variety of experience in the building business and what is equally important, he has the old instinct of workmanship developed to an unusual degree. He likes to work out interesting building problems and his greatest delight is in building well and of good mate-

South front of the clubhouse showing the pergola connecting it with the old clubhouse. Banta & Wolary were the builders

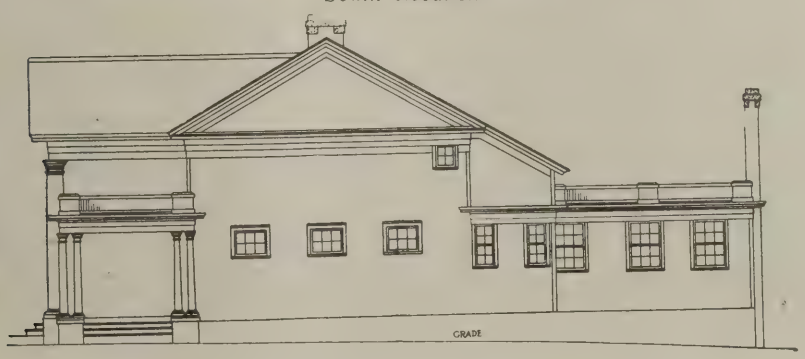


First floor plan



Second floor plan

South elevation



North elevation

rials. He keeps informed on what is going on in the industry by subscribing for and reading religiously some fifteen building and architectural journals. He has a filing cabinet filled with clippings from them of articles on subjects of particular interest to him and of plans and designs of buildings that he may have a chance to build some day.

Consequently when it came time for the Centerville Country Club to build a club house he was loaded with ideas and suggestions for them. He worked out the impressive Colonial design illustrated here, and devised a plan that provides for both the present and future requirements of the club most successfully. The building has attracted so much attention already—it was built just this last spring—that the country club of a neighboring city junked the plans which they had had drawn and invited the builder of the Centerville club house to help them prepare new ones.

The most remarkable thing about the club house of the Centerville Country Club is its very low cost. It was built complete for less than $15,000. That is a most reasonable figure for a two-story building 30x82 feet with a 28x30 foot addition in the rear and an open porch across one entire side and end. The building was not built, however, for year 'round use and hence no provisions for heating it were made.

The porch is one of the most useful as well as most attractive features of the house. The club house is built on a hill and can be seen from miles around. Likewise it commands a view of the surrounding country as well as the entire golf course that makes the porch extremely popular with the non-playing members of the club. The main club room is so placed as to get light and air from windows and doors on three sides. It has been decorated and furnished in a gay manner that suggests the festive purposes which it serves. Meals for large numbers of guests are often served in this room and on the porch, but there is in addition a smaller dining room large enough to accommodate the ordinary crowd. The kitchen is equipped with a long sink and work table and abundant cupboard space.

The women's locker and rest rooms are on the first floor; the men's locker room and the professional's shop or work room on the second floor. There is a complement of showers and dressing rooms in each case sufficient to serve the club membership for some time to come.

An interesting phase of this building project is in the use that has been made of the old club house. It was hardly more than a one-room shed, but its lines were good, its porch usable and its floor in good shape. Consequently it was preserved for a dance hall and it was connected with the building by means of a latticed pergola. Thus the main club room is saved from the dancers at the small parties, yet for the large ones a great many couples can be accommodated by using both floors.

New Shops for Old Improve Valuable Property

W. A. BUNGE, plumbing and heating contractor in Oak Park, Illinois, owned two lots on one of the principal business streets of the village. There were two 50-year-old frame buildings on these lots which were not only out of date and out of keeping with the large, new storage warehouse next door and other nearby buildings, but they were not productive enough to justify the valuable property which they occupied. Consequently Mr. Bunge decided to erect a new building and the type of building that replaced the old structures is one which will appeal to many small store and shopkeepers.

The exterior of the building is of unique design. It is of terra cotta and stucco with brick used in the panel over the entrance. The stucco and terra cotta are of ivory color with the half-timber work of a dark tan, and the brick are of darker tone to harmonize. The roof is of slate shingles.

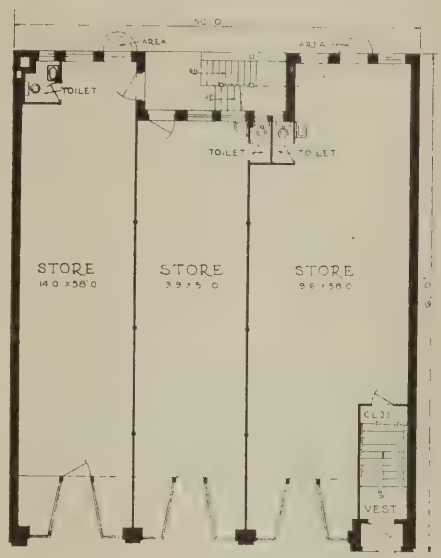
Downstairs are three stores of different sizes, each with abundant show window space in the front and with toilet facilities in the rear. Goods are received from an alley in the rear through the back doors. Each store has two windows in the rear providing light and air.

A special entrance provides access to the shops on the second floor. Its design and arrangement are such as to announce to the passerby the existence of the second floor shops, thus attracting trade to them.

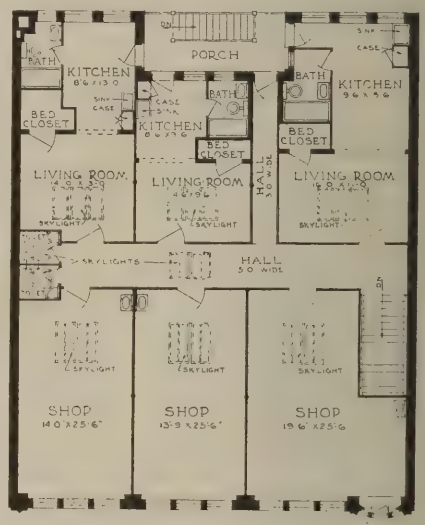
A noteworthy feature of the second floor plan are the living quarters for the owners or managers of the stores or shops. These apartments are quite distinct from the other parts of the building, but they are readily accessible from either the shops on the second floor by way of the hall, or the stores on the first floor by way of the stairway in the rear of the building. A hall also connects the main second floor hall with the rear porch. This arrangement simplifies the renting problem somewhat, for the stores or shops do not have to be rented as units with the apartments, yet the tenant who wishes to live close to his place of business can conveniently do so. Each living room is lighted and ventilated through a skylight and a closet bed makes it into a bedroom at night. Each apartment has a bathroom with full equipment and with outside light and ventilation through a window. A sink and case serve kitchen purposes.

Tallmadge & Watson were the architects; Harper & Butendorff Company, the mason contractors, and the owner, W. A. Bunge, did the plumbing and heating.

A combination store and shop building with living quarters. Terra-cotta, stucco, and brick, with half timber, have been tastefully used in the design



First floor plan



Second floor plan

These two old shacks occupied the valuable site before the new building was started

A Group of Three Houses

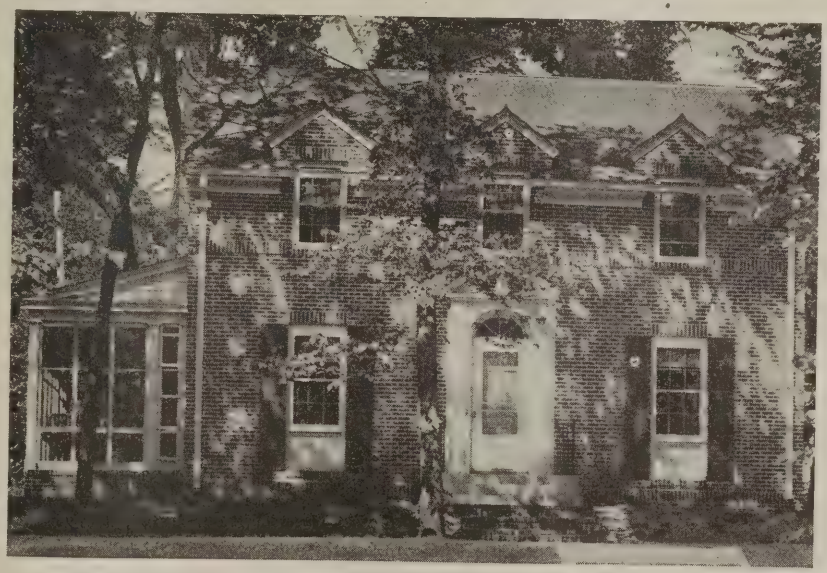
Drawn Especially for NATIONAL BUILDER by the Regional Bureaus of The Architects Small House Service Bureau of The United States Inc. with Complete Quantity Surveys

TRADE MARK

WITH this issue NATIONAL BUILDER has published, during 1923, complete plans for thirty-six small houses, designed especially for this journal by The Architects' Small House Service Bureau. The last three houses in this series appear on the following pages.

Many of these houses have been built time and again in various parts of the country. They will continue to be built, for their designs and plans are the kind that will never go out of style. The above illustration shows the genuine beauty of these houses when actually built according to the plans.

This service will be continued in modified form during 1924; that is, complete working drawings, including plans, elevations, sections, details, door and window schedules, with quantity surveys, will be published in each issue.



House No. 6A45 as built by Douglas Anderson, contractor in Minneapolis. The complete plans were published in National Builder for January, 1923

Subscribers for NATIONAL BUILDER desiring blue prints of any of these houses are, by special arrangement, entitled to purchase them at one-half the regular price. Orders should be addressed to NATIONAL BUILDER for authenticating the purchaser as a bona fide subscriber but checks should be made out to The Architects' Small House Service Bureau. Duplicate sets of blue prints are $3.00 each; specifications are $2.50 a set and extra quantity surveys are $3.00 a set.

Below is an explanation of the material and wiring symbols and miscellaneous data pertaining to plans on the following pages

MATERIALS		ELECTRIC WIRING SYMBOLS			
CONCRETE		CEILING OUTLET		3 WAY SWITCH	
BRICK		DROP CORD		GAS OUTLET	
WOOD		BRACKET		PUSH BUTTON	
PLASTER		BASE PLUG		BELL OUTLET	
TILE		SWITCH		BUZZER	

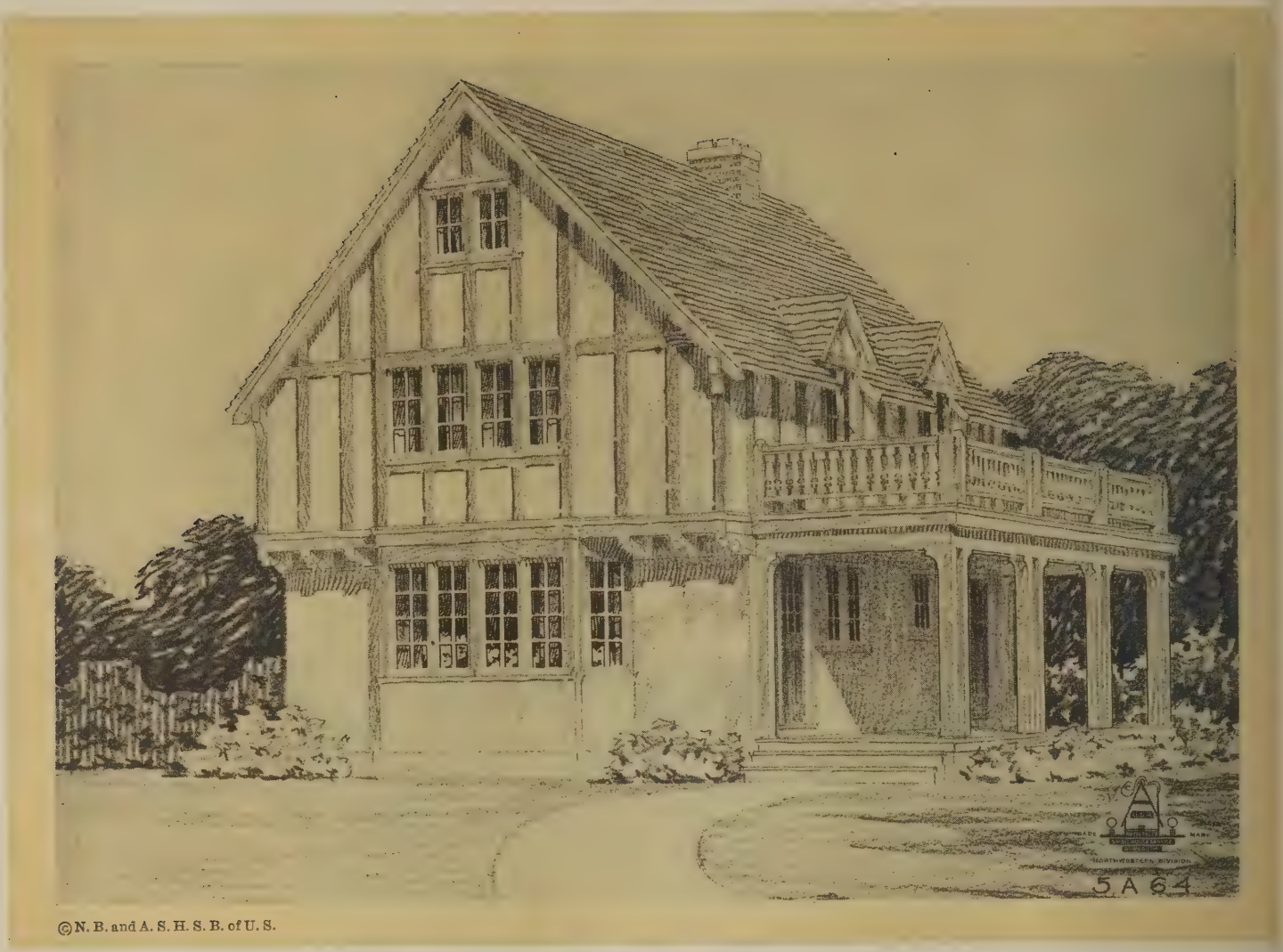
Dimensions are taken to outside of foundation walls, to outside of studs on exterior walls and center of studs for partitions.

Foundation walls shown concrete may be stone, brick, concrete block, or load-bearing hollow tile.

Where building ordinances permit, foundation walls may be 9 in. thick (with 20x9-in. footings), except in case of stone, which shall be 18 in. thick.

Stock numbers refer to moldings in Universal Millwork Design Book No. 20. In case these mouldings cannot be procured, others of similar design and size may be substituted.

Provide 1⅛-in. screen and storm sash for all exterior openings, except ice door, unless otherwise noted. Bottom rail of storm sash to have vent.



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A Plan Especially Suited to the Requirements of the Farm Family

House No. 5A64, designed especially for National Builder by The Architects' Small House Service Bureau

THIS is a farm house in the English style that has been devised from the same general plan arrangement as plan No. 5A57 that was shown in the June issue of NATIONAL BUILDER.

The exterior treatment in this case is stucco, the severity of which has been relieved by half timber work and brackets in the second story. In case it is desired to reduce expense, the wooden battens and brackets could be omitted and the plaster run directly to the eaves.

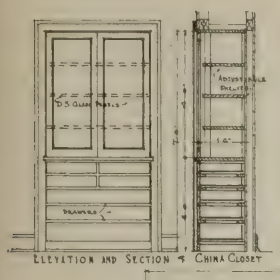
This house, like 5A57, has been worked out so as to make it an extraordinarily useful home. There is a large living and dining room which is entered from a generous porch. This combined living and dining room may have a fireplace in case one is wanted. The kitchen is connected directly thereto. The kitchen has been made unusually large to comply with the seasonal requirements of farm kitchens. Pantry, cupboard spaces, and closets complete the kitchen arrangements. The open porch may be used as a dining porch in the summer time, for it also opens off the kitchen.

On the first floor there is a wash room to be used by the men on their return from their work. This room is also equipped with laundry trays.

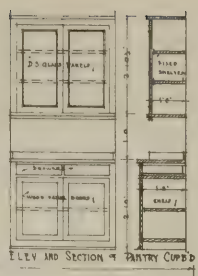
In the second story there are three good size bedrooms and one small one. The smaller bedroom can be made into a bathroom if that is preferred.

Structurally the house has masonry foundations, frame walls, and a shingle roof.

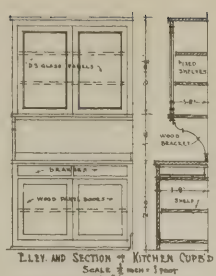
The regular price of the blue prints of this design is $25.50 ($13.00 to NATIONAL BUILDER subscribers).



ELEVATION AND SECTION OF CHINA CLOSET



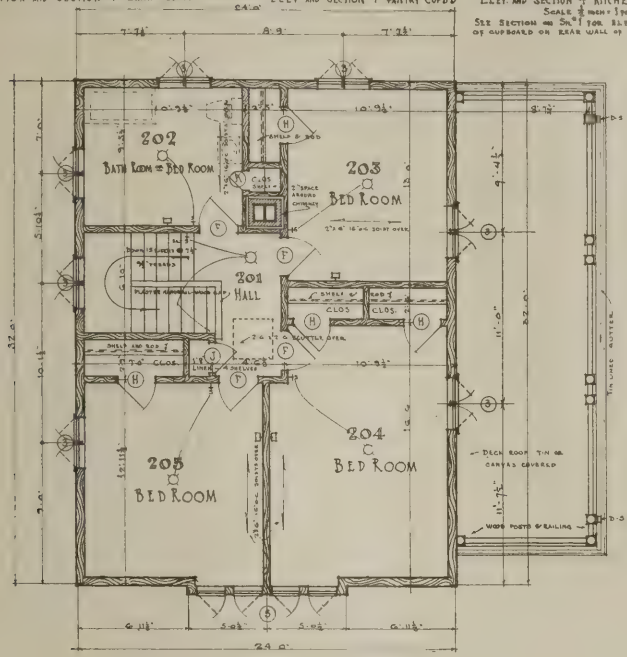
ELEV. AND SECTION OF PANTRY CUPBD



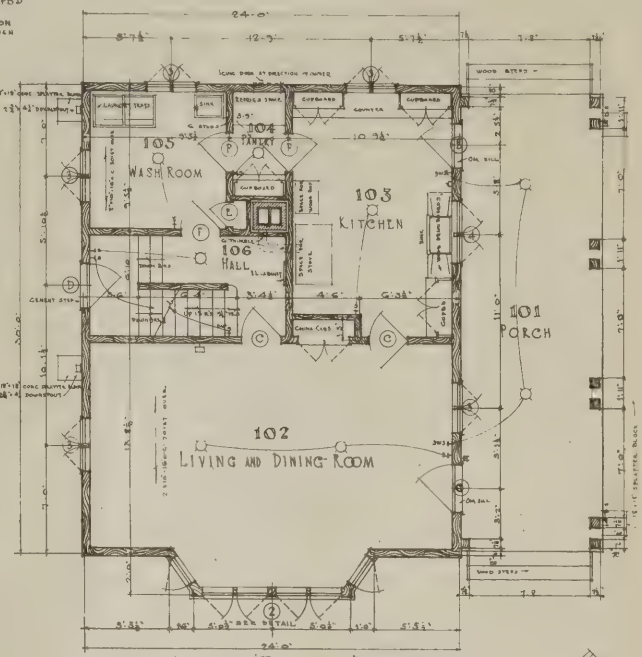
ELEV. AND SECTION OF KITCHEN CUPBD
Scale ½ inch = 1 foot
See Section and Sk. for Elevation of Cupboard or Rear Wall of Kitchen

Schedule of Windows							
Quan.	Type	Description	Lights	Size	Sash Size	Thick's	Pearl
5	1	Top Hinged	3	8'-10	2'-4 x 1'-3	1¾"	See Detail
6	2	Casement	8	10'-1	2'-0 x 3'-1"	1¾"	"
12	3	"	6	8'-1	2'-0 x 2'-3	1¾"	"
1	4	"	6	8'-1	2'-0 x 2'-3	1¾"	"
4	5	"	6	5'-1	1'-10½ x 3'-11"	1¾"	"
3	6	"	4	5'-1	1'-10½ x 2'-3	1¾"	"

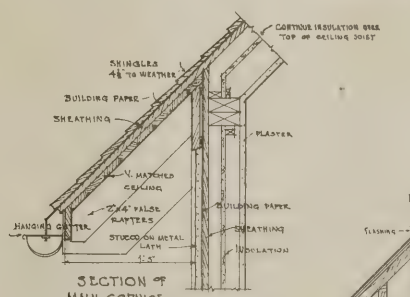
Schedule of Doors				
Quan.	Type	Size	Det.	
1	A	2'-8 x 6'-6 x 1¾	#720	Six Panel
1	B	2'-6 x 7'-0 x 1¾	#1600	Mirr. Pl. Gl.
2	C	2'-6 x 7'-0 x 1¾	#102	2 Panel
1	D	2'-8 x 6'-8 x 1¾	#1600	Silver Pl. Gl.
1	E	2'-6 x 6'-8 x 1¾	#102	2 Panel
7	F	2'-6 x 6'-8 x 1¾	"	"
1	G	3'-0 x 7'-0 x 1¾	#1600	Silv. Pl. Gl.
4	H	2'-4 x 6'-6 x 1¾	#1102	2 Panel
1	J	1'-10 x 6'-6 x 1¾	"	"
1	K	1'-2 x 6'-8 x 1¾	"	"



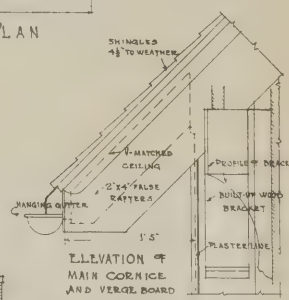
SECOND FLOOR PLAN
Scale ¼ inch = 1 foot



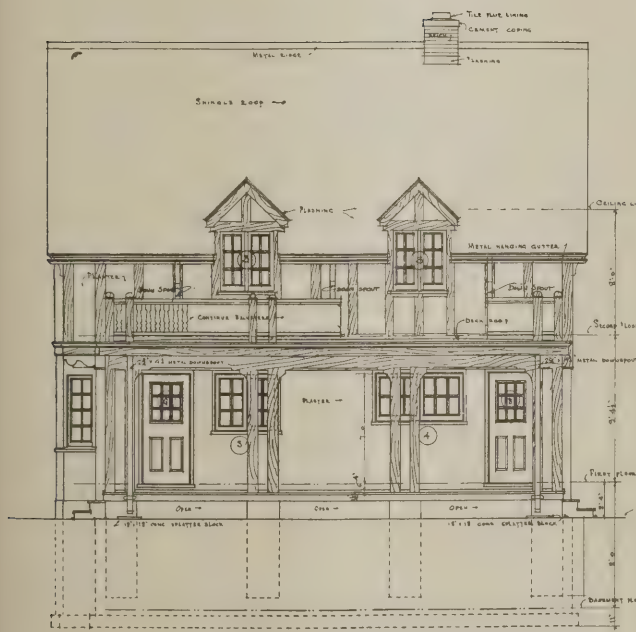
FIRST FLOOR PLAN
Scale ¼ inch = 1 foot



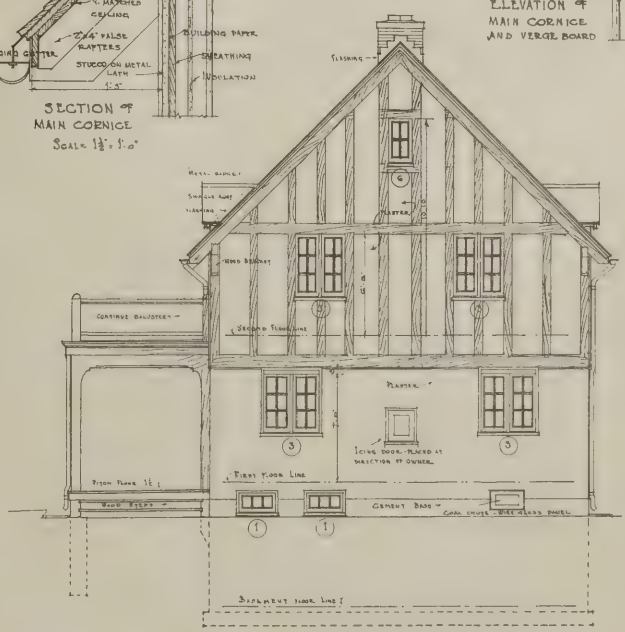
SECTION OF MAIN CORNICE
Scale 1½" = 1'-0"



ELEVATION OF MAIN CORNICE AND VERGE BOARD



RIGHT SIDE ELEVATION



REAR ELEVATION

Scale ¼ inch = 1 foot

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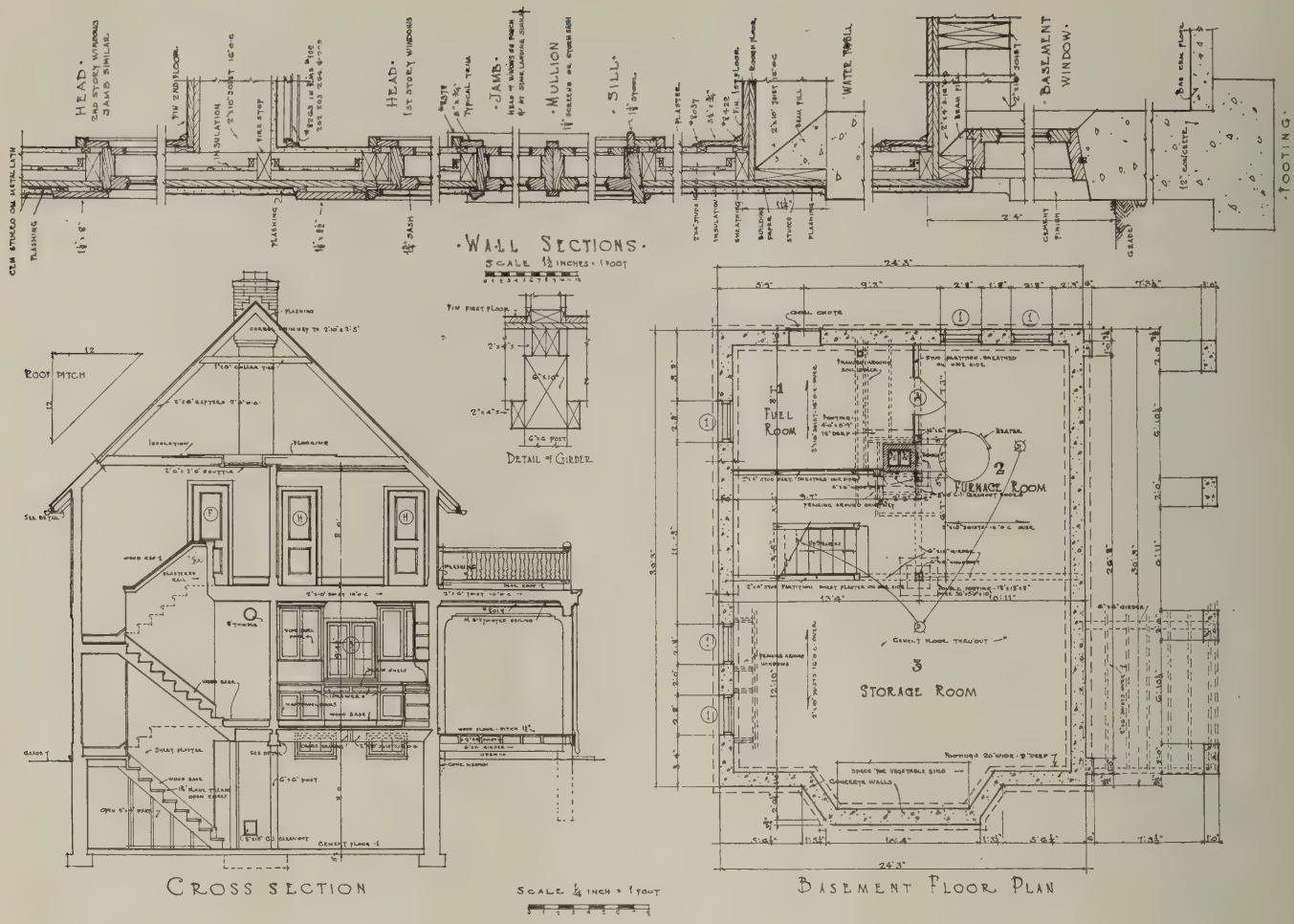
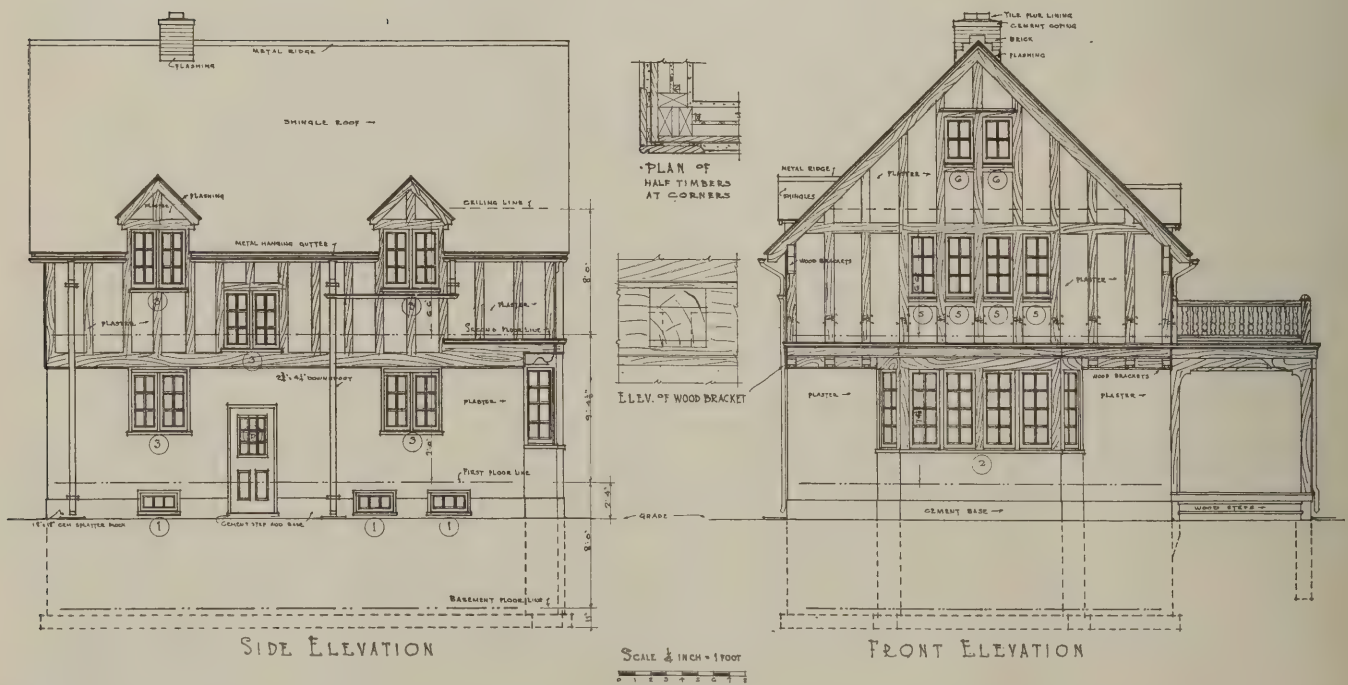
Plans, elevations, door and window schedules and details for House No. 5A64, designed especially for National Builder by The Architects' Small House Service Buredu





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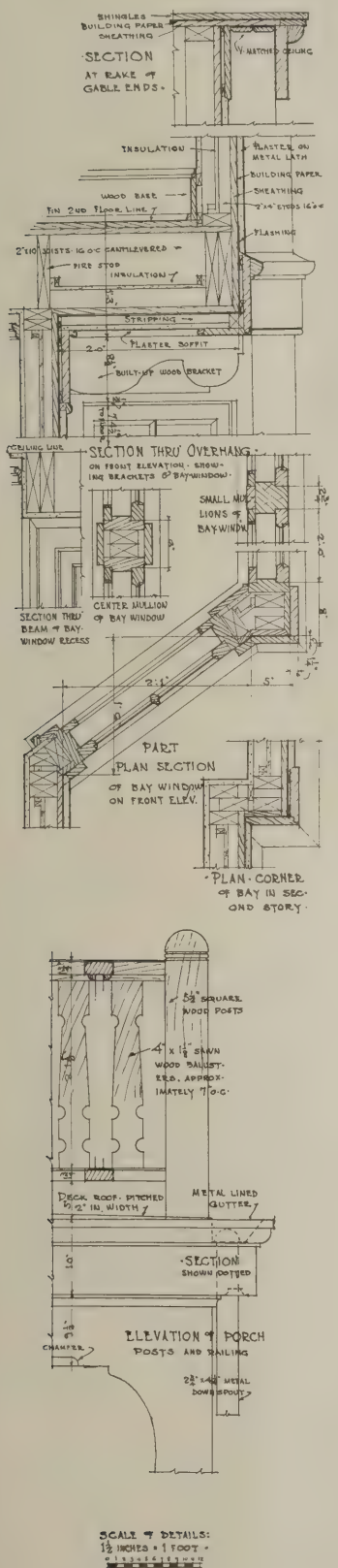
Elevations, sections and basement plans for House No. 5A64, designed especially for National Builder by The Architects' Small House Service Bureau

EXCAVATING—172 cu. yd.
BACKFILLING—53 cu. yd.
FOUNDATION—If 12″ concrete, 38 cu. yd gravel, 154 sax cement; if 9″ concrete, 29 cu. yd. gravel, 118 sax cement; if 12″ tile, 18000 CBM tile, 13 cu. yd. mortar; if 9″ tile, 13500 CBM tile, 10 cu. yd. mortar.
CEMENT FLOORS—5 cu. yd. gravel; 3 cu. yd. sand; 50 sax cement; 4 cement spatter blocks.
CHIMNEY—2000 common brick; 280 face brick; 68 lin. ft. 8x12 flue tile; 2 cu. yd. mortar; 2—8x10 cleanout doors; 1—8″ thimble; 2—6″ adjustable thimbles; 4 yd. metal lath.


SECTION AT RAKE OF GABLE ENDS
SECTION THRU OVERHANG ON FRONT ELEVATION - SHOWING BRACKETS OF BAY WINDOW
PART PLAN SECTION OF BAY WINDOW ON FRONT ELEV.
PLAN CORNER OF BAY IN SECOND STORY
ELEVATION OF PORCH POSTS AND RAILING
SCALE OF DETAILS: 1½ INCHES = 1 FOOT

LATH—9 yd. metal lath over furnace; 9800 wood lath; 230 yd. metal lath for stucco.

PLASTER—9 yd. plaster on metal lath over furnace; 700 yds. plaster on wood lath; 230 yd. stucco on metal lath; 19 yd. Keene's cement; 20 yds. plaster on cement foundation.

TILE FLOORS—90 sq. ft. ceramic tile; 36 lin. ft. cove base.

LUMBER—4—6x6-7 posts; 2—4x4-7 posts; 1—6x10-24 girder; 1—6x10-16 girder; 4—2x4-12 girder ribbon; 2—2x4-16 girder ribbon; 4—6x6-9 girder porch; 3—2x10-14 stair horses basement; 90 lin. ft. 2x4 basement partition plates; 24—2x4-7 basement partition studs; 300 ft. D&M basement partition sheathing; 4 ft. of plank cleanout cover; **First Floor Joist**: 8—2x6-20; 8—2x6-12; 9—2x10-14; 9—2x10-16; 13—2x10-12; 11—2x10-16; 5—2x10-12 box sill; 330 lin. ft. 1x3 bridging; 4—2x10-16 headers; 820 ft. com. bds. 1st floor subfloor; 1030 ft. 13/16x1½ first floor finish floor; 328 ft. 4″ flooring for porch; 300 ft. ⅝x4 ceiling for porch; 2—2x10-10 step horses; **Porch Girders Beams**: 4—2x6-9; 2—2x6-20; 2—2x6-10; 258 lin. ft. 2x4 first floor partition plates; 76—2x4-9 first floor partition studs; 3—2x10-16 stair horses; 50 lin. ft. 1x4 ribbon; **Second Floor Joist**: 10—2x10-18; 10—2x10-14; 13—2x10-14; 13—2x10-12; 4—2x10-16 headers and doubles; 800 ft. com. bds. second floor subfloor; 900 ft. 13/16x1½ second floor finish floor; 1200 lin. ft. grounds; 25—2x6-22 second floor ceiling joist; 25—1x6-8 collar ties; 23—2x6-10 porch rafters; 324 lin. ft. 2x4 OS wall plates; 86—2x4-16 OS wall studs; 21—2x4-14 opening doubles; 5—2x4-16 opening headers; 20—2x4-12 gable studs; 10—2x4-16 dormer studs and plates; 50—2x4-20 rafters; 36 lin. ft. 1x8 ridge rafter; 1800 ft. boards roof sheathing; 11½M shingles; 3 squares of canvas roofing; 2400 ft. shiplap wall sheathing; **Scaffold and Extras**: 25—2x4-18; 4—2x6-16; 6—2x8-16; 4—2x10-14.

MILLWORK—Frames: 5 sash 8x10-3L-1¾; 1 quadruple casement 10x14-8L-1¾; 2 single casement 10x14-8L-1¾; 12 mul. casement 8x14-6L-1¾; 1 mul. casement 8x14-6L-1¾; 1 quadruple casement 9x14-6L-1¾; 3 single casement 9x14-4L-1¾. **Windows**: 5 sash 8x10-3L-1¾; 6 casements 10x14-8L-1¾; 24 casements 8x14-6L-1¾; 2 casements 8x14-6L-1¾; 4 casements 9x14-6L-1¾; 3 casements 9x14-4L-1¾. **Storm Sash**: 5—8x10-3L-1⅛; 6—10x14-8L-1⅛; 12 pr. 8x14-6L-1⅛; 1 pr. 8x14-6L-1⅛; 4—9x14-6L-1⅛; 3—9x14-4L-1⅛. **Screens**: 5—8x10-3L-1⅛; 6—10x14-8L-1⅛; 13 for pairs 8x14-6L-1⅛; 4—9x14-6L-1⅛; 3—9x14-4L-1⅛. **Outside Door Frames**: 1—2′10x7′0-1¾; 1—2′8x6′8-1¾; 1—3′0x7′0-1¾; 1 icing door frame. **Outside Doors**: 1—2′10x7′0 (No. 1600); 1—2′8x6′8 (No. 1600); 1—3′0x7′0 (No. 1600); 1 icing door. **Screen Doors**: 1—2′10x7′0-1⅛; 1—2′8x6′8-1⅛; 1—3′0x7′0-1⅛. **Storm Doors**: 1—2′10x7′0-1⅛; 1—2′8x6′8-1⅛; 1—3′0x7′0-1⅛. **Exterior Millwork**: 52 lin. ft. porch cornice; 10 porch posts; 82 lin. ft. porch cove; 82 lin. ft. inside porch facia; 52 lin. ft. porch soffit; 52 lin. ft. porch facia; 46 lin. ft. deck rail; 40 lin ft. dormer cornice; 4 gable brackets; 148 lin. ft. main cornice; 160 lin. ft. belt; 528 lin. ft. panel strips; 2 set entrance steps; 52 lin. ft. porch base; 6 wood brackets. **Interior Doors**: 1—2′8x6′6-1⅜ (No. 720); 2—2′6x7′0-1⅜ (No. 1102); 1—1′6x6′8-1⅜ (No. 1102); 7—2′6x6′8-1⅜ (No. 1102); 4—2′4x6′6-1⅜ (No. 1102); 1—1′10x6′6—1⅜ (No. 1102); 1—1′2x6′8-1⅜ (No. 1102). **Jambs**: 1—2′8x6′6; 2—2′6x7′0; 1—1′6x6′8; 7—2′6x6′8; 4—2′4x6′6; 1—1′10x6′6; 1—1′2x6′8. **Interior Trim**: 5 side 8x10-3L; 1 side quadruple 10x14-8L; 2 side single 10x14-8L; 12 side mul. 8x14-6L; 1 side mul. 8x14-6L; 1 side quadruple 9x14-6L; 3 side single 9x14-6L; 1 side door 2′10x7′0; 1 side door 2′8x6′8; 1 side door 3′0x7′0; 1 side icing door; 2 side door 2′8x6′6; 4 side door 2′6x7′0; 2 side door 1′6x6′8; 14 side door 2′6x6′8; 8 side door 2′4x6′6; 2 side door 1′10x6′6; 2 side door 1′2x6′8; 1 flight basement stairs; 1 flight grade stairs; 1 flight main stairs with rail; 1 scuttle door; 1 scuttle door jamb; 1 scuttle door side trim; 1 pantry cupboard 3′3; 2—3′3 kitchen cupboards; 1—11′0 kitchen counter; 2 wood drain boards; 1—4′0 kitchen cupboard; 1—4′0 china closet; 520 lin. ft. base; 520 lin. ft. base shoe; 520 lin. ft. base molding; 280 lin. ft. picture molding; 24 lin. ft. closet shelving; 24 lin. ft. closet hook strip; 24 lin. ft. closet clothes rod; 80 lin. ft. ceiling cove; 9 lin. ft. threshold.

INSULATION—700 ft. ½″ vegetable fibre or equal for ceiling; 1650 ft. ½″ vegetable fibre or equal for walls; 3 rolls felt for floors; 4 rolls felt for walls; 4 rolls felt for roof.

WEATHER STRIPPING—5 sash 8x10-3L; 6 sash 10x14-8L; 26 sash 8x14-6L; 4 sash 9x14-6L; 3 sash 9x14-4L; 1 door 2′10x7′0; 1 door 2′8x6′8; 1 door 3′0x7′0.

CAULKING—5 sash frames; 2 quadruple frames; 13 mullion frames; 5 single frames; 3 door frames; 1 icing frame; 1 coal chute.

HARDWARE—5 cellar sash sets; 39 casement sash sets with butts; 31 storm sash sets; 31 screen sets; 2 front door sets with butts; 1 rear door set with butts; 1 icing door set with butts; 3 screen door sets with butts; 3 storm door sets with butts; 1 floor hinge; 2 push plates; 16 inside door sets with butts; 20 door bumpers; 3 dozen clothes hooks; 4 stair rail brackets; 1 pr. hinges for scuttle door; **China Closet**: 2 pr. ornamental butts; 1 cupboard turn; 1 blind catch; 10 drawer pulls; **Pantry Cupboard**: 4 pr. ornamental butts; 2 elbow catches; 2 cupboard turns; 2 drawer pulls; **Kitchen Cupboards**: 4 pr. ornamental butts; 2 cupboard turns; 2 elbow catches; 5 drawer pulls; **Kitchen Cupboards**: 7 pr. ornamental butts; 4 cupboard turns; 3 elbow catches; 5 drawer pulls; 1 set castors; 2 set brackets for drain boards; 1300 lb. assorted nails; 1 coal chute; 6 lbs. assorted brads.

TINWORK—50 lin. ft. ridge roll; 6 finials; 52 lin. ft. porch gutter; 2 miters; 2 ends; 54 lin. ft. main gutter; 12 gutter ends; 10 nipples; 10 offsets; 4 shutoffs; 30 hangers; 70 lin. ft. conductor; 12 conductor hooks; 12 lin. ft. chimney flashing; 32 lin. ft. porch flashing; 40 lin. ft. valley tin; 300 sq. ft. tin deck if used in place of canvas; 10 elbows; 10 strainers; 4 sheets sheet tin; 300 tin shingles.

EXTERIOR PAINTING—6 gal. trim paint; 35 gal. shingle paint; 2 gal. deck paint; 2 gal. porch floor; 1 gal. sash; ½ gal. screen; 15 lbs. putty; 1 gal. oil; ½ gal. shellac; 2 gal. Japan; 1 gal. turpentine.

INTERIOR PAINTING—12 gal. white paint; 8 gal. enamel; 5 gal. filler stain; 3 gal. shellac; 9 gal. varnish; 3 gal. floor shellac; 6 gal. floor varnish; 2 gal. oil; 1 gal. japan; 1 gal. turpentine; 1 gal. alcohol; 4 doz. sheets sandpaper; 3 lbs. steel wool.

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Construction details and quantity survey for House No. 5A64, designed especially for National Builder by The Architects' Small House Service Bureau

From Cape Town, South Africa

SEA POINT, South Africa, June 11.—A line to let you know that we are still very much alive in Cape Town. Work fairly plentiful and likely to be for a couple of years. Conditions appear to have reached what must be considered as normal in view of the fact that prices have remained almost stationary for the past eighteen months, with just the usual fluctuations which we had pre-war. Men are working quite all right today and we have no cause to complain on that score.

I should like to say how much we appreciate the NATIONAL BUILDER with its bright, new and common sense articles, from which we have derived much benefit.

Our subscription is enclosed herewith, which please place on our credit.

I have great hopes of visiting the U. S. A. next year and if I do I should like to have the pleasure of meeting you personally. We are still kept busy. Do you remember some one writing an article in NATIONAL BUILDER, "Do a man a good job, he only kicks once—when he pays—but do him a cheap job he never stops kicking." We have been trying to give them good jobs at a fair price, and so far every client is our best friend.

We are looking forward to the erection of a block of flats, for an investment for ourselves, when we can find the time. Any advise you can give us regarding fittings, etc., will be appreciated.

With our best wishes, we remain,

James & Babb,
Designers and Builders.

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House No. 6A63, designed especially for National Builder by The Architects' Small House Service Bureau

Beauty, Comfort and Convenience Are Combined in This Plan and Design

THIS is a new plan type in our series. It is a brick veneer house, in the English style, on masonry foundations.

As the house is designed, it would suit almost any lot facing. If there are particular conditions of prevailing winds or lighting or something about the lot that would make it desirable to reverse the plans, that could easily be done. This house will go very nicely on a 40-foot lot.

One enters the house through a brick arched way or loggia directly to a stair hall where there is a passage to the left to the living room; or through another entrance at grade into the kitchen. There is a niche for the telephone in the stair hall and a commodious closet for coats.

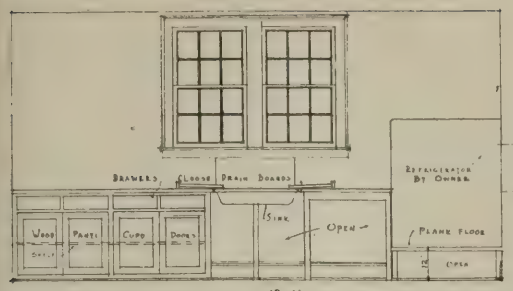
The living room about 23 feet wide by 13 feet in depth, is notable for its fine proportions and more especially perhaps on account of the very large window along the front wall. This window is 13 feet in length. There is a fireplace and a plaster arch leading into the dining room. In the plaster arch there are book shelves.

The dining room is about 12 feet 6 inches by 15 feet, having two double windows.

The kitchen is 16 feet long by 9 feet deep. It is a model of convenient arrangement and complete equipment for the modern housewife.

Upstairs are found three good size bedrooms, each with a generous closet. The bathroom has a built-in closet for linen. There is also another linen closet opening into the hallway.

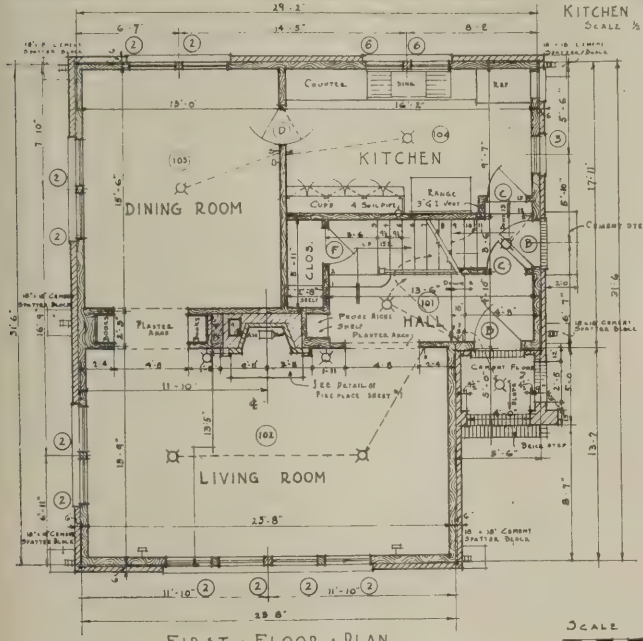
The regular price of the blue prints for this house is $30.50 ($15.50 to NATIONAL BUILDER subscribers).



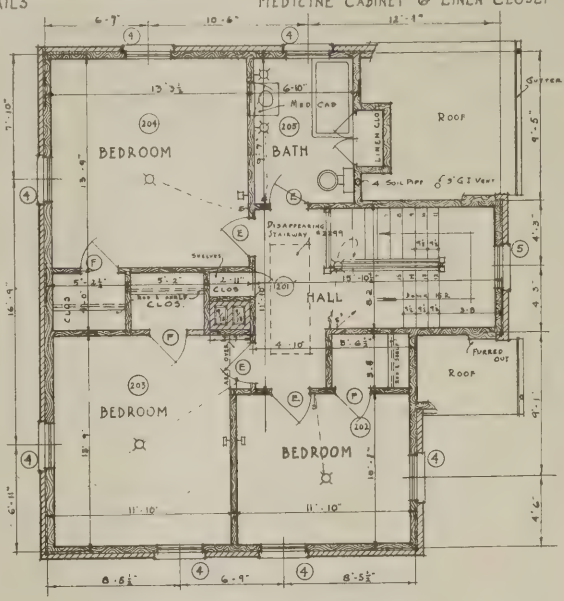
KITCHEN DETAILS
SCALE ½" = 1'-0"

MEDICINE CABINET & LINEN CLOSET

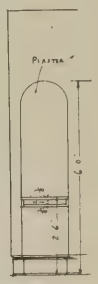
CLOSET IN 2ND FLOOR HALL
SCALE ½" = 1'-0"



FIRST · FLOOR · PLAN



SECOND · FLOOR · PLAN



PHONE NICHE
SCALE ½" = 1'-0"

SCALE
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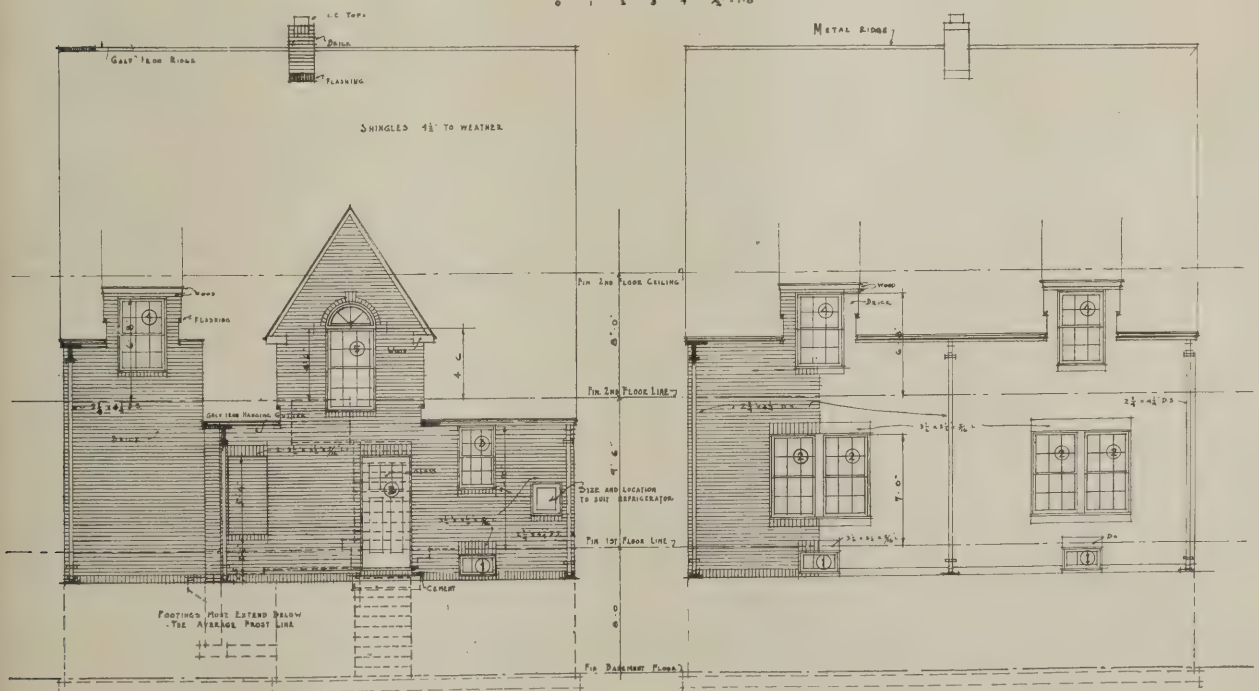
0 1 2 3 4 ¼" = 1'-0"



SIDE ELEVATIONS

SCALE
0 1 2 3 4 5 6 7 8 9 - ¼" = 1'-0"
0 ½ 1 1½ 1½" = 1'-0"

SCHEDULE OF DOORS.

QUANTITY	TYPE	SIZE	DESCRIPTION	REMARKS
1	A	2'-6"×6'-8"×1¾"	UNIT #720	FUEL R.M.
2	D	3'-0"×7'-0"×1¾"	" #246	EXTERIOR
2	C	2'-6"×7'-0"×1¾"	UNIT #1130	INTERIOR
1	D	2'-6"×7'-0"×1¾"	" "	SWINGING
4	E	2'-6"×6'-6"×1¾"	" "	INTERIOR
3	F	2'-4"×6'-6"×1¾"	" "	CLOSETS

SCHEDULE OF WINDOWS.

QUANTITY	TYPE	DESCRIPTION	NO. OF LIGHTS	SIZE OF GLASS	SIZE OF OPG. FOR SASH	MUNTINS	FRAME
4	1	BASEMENT	3	8×10	2'-4"×1'-5"	1½	SEE DETAIL
10	2	DOUBLE HUNG	12	10×14	2'-10½"×5'-5"	"	" "
3	3	DOUBLE HUNG	12	8×10	2'-4"×5'-10"	"	" "
7	4	DOUBLE HUNG	12	10×12	2'-10½"×4'-6"	"	" "
1	5	DOUBLE HUNG TRANSOM	12	10×14	2'-11"×4'-6"	"	TYPE 2 WITH TRANSOM OVER SEE DETAIL
2	6	AWNING SASH & FIXATION	12	8×10	2'-4"×3'-10"	"	" "

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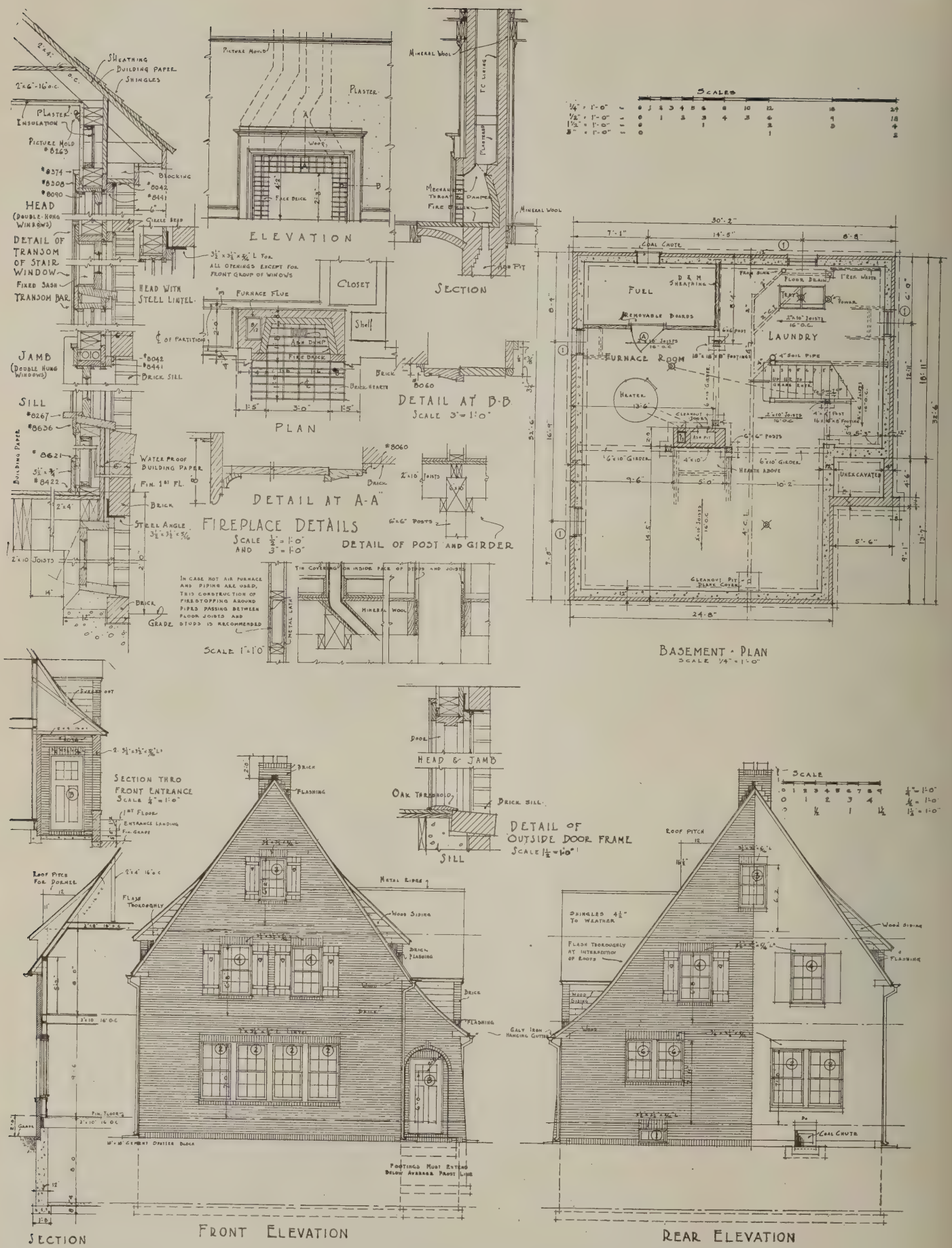
Plans, elevations, details and door and window schedules for House No. 6A63, designed especially for National Builder by The Architects' Small House Service Bureau



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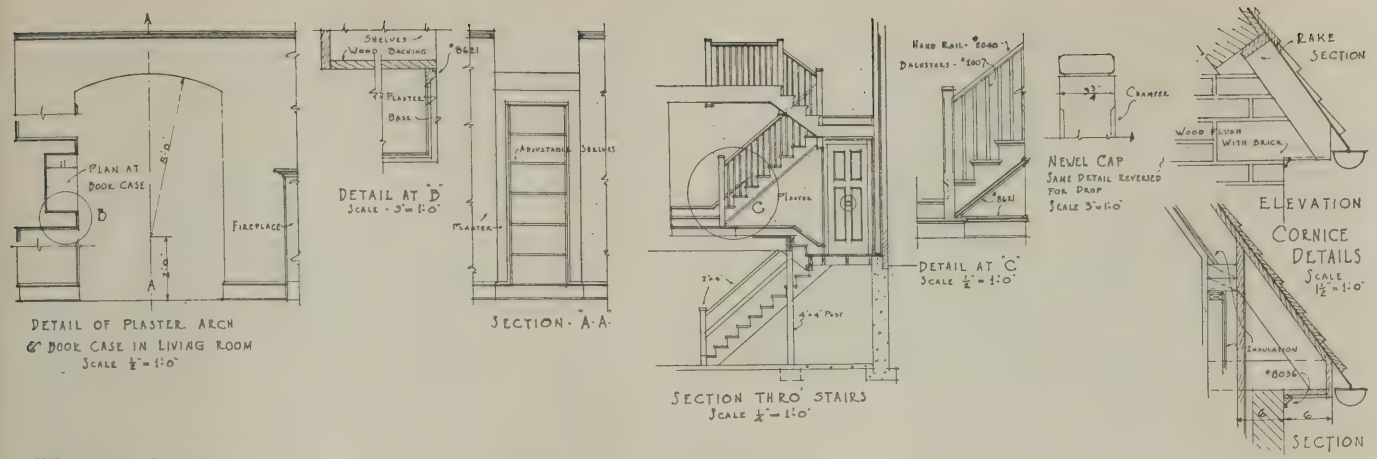
Basement plan, elevations and details for House No. 6A63, designed especially for National Builder by The Architects' Small House Service Bureau



EXCAVATING—225 cu. yds.
BACKFILLING—48 cu. yds.
FOUNDATIONS—If 12" concrete, 45 cu. yd. gravel, 182 sax cement; if 9" concrete, 36 cu. yd. gravel, 146 sax cement; if 12" tile, 21600 CBM tile, 16 cu. yd. mortar; if 9" tile, 16300 CBM tile, 13 cu. yd. motar.
CEMENT FLOOR—6 cu. yd. gravel; 4 cu. yd. sand; 62 sax cement; 6 cement spatter blocks.
FACE BRICK—14,000 face brick; 12 cu. yd. mortar; 840 lb. mortar color.
CHIMNEY—3060 common brick; 240 face brick; 80 fire brick; 14 sq. ft. hearth tile; 160 inside face brick; 68 lin. ft. 8x12 flue tile; 15 lbs. fire clay; 3 cu. yd. mortar; 1 cast iron ash dump; 1 throat and damper; 1 angle 4x3x5/16-3'6; 2—8x10 cleanout doors; 1—8" thimble; 2—6" thimbles; 5 yd. metal lath.
LATH—9 yds. metal lath; 11200 wood lath.
PLASTER—9 yd. plaster on metal; 800 yd. plaster on wood lath; 18 yd. Keene's cement.
TILE FLOOR—54 sq. ft. ceramic tile; 26 lin. ft. cove.

LUMBER—4—6x6-7 posts; 3—4x4-7 posts; 1—6x10-24 girder; 1—6x10-16 girder; 1—6x10-5 girder; 90 lin. ft. 2x4 girder ribbon; 90 lin. ft. 2x4 girder plates; 4 ft. 2" plank cleanout cover; 54 lin. ft. 2x4 basement partition plates; 16—2x4-7 basement partition studs; 180 ft. D&M basement partition sheathing; 3—2x10-14 basement stair horses; **First Floor Joist:** 6—2x6-8; 35—2x10-14; 15—2x10-16; 60 lin. ft. 2x10 box sill; **Headers and Doubles:** 4—2x10-16; 3—2x10-14; 930 ft. com. bds. first floor subfloor; 1170 ft. 13/16x1½ first floor finish floor; 320 lin. ft. 1x3 bridging; 1150 lin. ft. grounds; 64 lin. ft. 1x4 ribbon; 300 lin. ft. 2x4 first floor partition plates; 88—2x4-9 first floor partition studs; 3—2x10-16 first floor stair horses; **Second Floor Joist:** 20—2x10-16; 15—2x10-14; 15—2x10-18; 4—2x10x14 headers; 850 ft. com. bds. second floor subfloor; 1000 ft. 13/16x1½ second floor finish floor; 300 lin. ft. 2x4 second floor partition plates; 88—2x4-8 second floor partion studs; **Second Floor Ceiling Joist:** 25—2x6-20; 6—2x6-9; 800 ft. D&M attic floor; 360 lin. ft. 2x4 outside wall plates; 98—2x4-16 outside wall studs; 17—2x4-18 cable studs; 12—2x4-16 dormer studs and plates; 24—2x4-14 opening doubles; 6—2x4-16 opening headers; 10—2x4-16 rafter braces; 20—2x4-14 look outs; 16—2x4-10 dormer rafters; **Rafters:** 52—2x4-24; 19—2x4-10; 46 lin. ft. 1x6 ribbon rafter; 2100 ft. com. bds. roof sheathing; 16M shingles; 2600 ft. shiplap wall sheathing; 5—2x4-5 porch ceiling joist; 6—2x10-8 opening headers; **Scaffold and Extras:** 30—2x4-18; 8—2x6-16; 4—2x8-16; 3—2x10-14; 200 ft. siding wall sheathing; 350 ft. ceiling porch ceiling and cornices.

MILLWORK—Frames: 4—8x10-3L-1⅜; 3 mul. 10x14-12L-1⅜; 1 quadruple 10x14-12L-1⅜; 3 single 8x10-12L-1⅜; 7 single 10x12-12L-1⅜; 1 single 10x14-12L-1⅜ tr. seg. top 1⅜; 1 mul. 8x10-12L-1⅜. **Windows:** 4 sash 8x10-3L-1⅜; 10 wds. 10x14-12L-1⅜; 3—8x10-12L-1⅜; 7—10x12-12L-1⅜; 1—10x14-12L-1⅜; 2—8x10-12L-1⅜; 1 seg. top transom. **Storm Windows:** 4 sash 8x10-3L-1⅛; 10—10x14-12L-1⅛; 3—8x10-12L-1⅛; 7—10x12-12L-1⅛; 1—10x14-12L-1⅛; 2—8x10-12L-1⅛; 1 seg. top. st. sh. **Screens:** 4—8x10-3L-1⅛; 10—10x14-12L-1⅛; 3—8x10-12L-1⅛; 7—10x12-12L-1⅛; 1—10x14-12L-1⅛; 2—8x10-12L-1⅛; 1—seg. top 1⅛. **Shutters:** 2 pr. for windows 8x10-12L-1⅛; 4 pr. for windows 10x12-12L-1⅛. **Outside Door Frames:** 2—3'0x7'0-1¾; 1 icing door frame. **Outside Doors:** 2—3'0x7'0-1¾ (No. 1246); 1 icing door. **Storm Doors:** 2—3'0x7'0-1⅛. **Screen Doors:** 2—3'0x7'0-1⅛. **Exterior Millwork:** 102 lin. ft. dormer cornice; 148 lin. ft. main cornice; 6 wood blocks. **Interior Doors:** 1—2'6x6'8-1⅜ (No. 720); 3—2'6x7'0-1⅜ (No. 1134); 1—2'6x7'0-1⅜ (No. 1134); 4—2'6x6'8-1⅜ (No. 1134); 3—2'4x6'8-1⅜ (No. 1134). **Jambs:** 1—2'6x6'8; 3—2'6x7'0; 1—2'6x7'0 (no stops); 4—2'6x6'8; 3—2'4x6'8. **Interior Trim:** 4 sides trim 8x10-3L; 3 sides mul. 10x14-12L; 1 side quad. 10x14-12L; 3 sides single 8x10-12L; 7 sides single 10x12-12L; 1 side single 10x14-12L seg. top tr.; 1 side mul. 8x10-12L; 2 side door 3'0x7'0; 1 side icing door; 2 side door 2'6x6'8; 6 side door 2'6x7'0; 2 side door 2'6x6'8; 8 side door 2'6x6'8; 6 side door 2'4x6'8; 1 flight grade stair; 1 flight basement stair; 1 flight main stair with rail; 1 flight disappearing stairs No. 2299; 1 linen cabinet 3'6; 1 medicine cabinet; 1 shelf closet door 1'0x6'8; 1 door jamb 1'0x6'8; 2 sides trim 1'0x6'8; 1 mantel shelf; 1 phone niche shelf; 2—1'6 bookcases; 1—7'8 kitchen cabinet; 1—5'0 counter cabinet; 2 drain boards; 580 lin. ft. base; 580 lin. ft. base shoe; 580 lin. ft. base molding; 320 lin. ft picture molding; 72 lin. ft. ceiling cove; 40 lin. ft. closet shelving; 40 lin. ft. closet hook strip; 20 lin. ft. closet clothes rod; 6 lin. ft. threshold; 28 lin. ft. band molding.
TINWORK—44 lin. ft. ridge roll; 3 finials; 12 lin. ft. chimney flashing; 24 lin. ft. valley tin; 72 lin. ft. flashing tin; 6 sheets sheet tin; 200 tin shingles; 60 lin. ft. gutter; 30 gutter hangers; 19 gutter ends; 6 nipples; 6 elbows; 6 offsets; 6 strainers; 6 shutoffs; 82 lin. ft. conductor; 12 conductor straps; 1000 brick wall ties.
LINTELS—4 for single frames 8x10-3L; 3 for mul. frames 10x14-12L; 1 for quadruple frames 10x14-12L; 3 for single frame 8x10-12L; 7 for single frame 10x12-12L; 1 for single frame 10x14-12L; 1 for mullion frame 8x10-12L; 2 for 3'0 doors; 1 for icing door;
REINFORCING STEEL—12—⅜ rods, 5'0.
INSULATION—3 rolls felt for floors; 5 rolls felt for walls; 4 rolls felt for roof; 2200 ft. ½" vegetable fibre or equal for walls; 1500 ft. ½" vegetable fibre or equal for gables and roof.
WEATHER STRIPPING—4 sash 8x10-3L; 10 wds. 10x14-12L; 3 wds. 8x10-12L; 7 wds. 10x12-12L; 1 wd. 10x14-12L; 2 wds. 8x10-12L; 2 doors 3'0x7'0.
CAULKING—15 single frames; 4 mullion frames; 1 quadruple frame; 2 door frames; 1 coal chute.
EXTERIOR PAINTING—6 gal. trim paint; 3 gal. boiled oil; 48 gal. shingle stain; ½ gal. siding paint; 1 gal. screen paint; 1 gal. sash color; ¼ gal. shutter color; ½ gal. storm sash paint; ½ gal. shellac; ½ gal. japan; 1 gal. turpentine; 5 lb. putty.
INTERIOR PAINTING—14 gal. white paint; 9 gal. enamel; 5 gal. filler stain; 3 gal. shellac; 9 gal. varnish; 3½ gal. floor shellac; 6 gal. floor varnish; 2 gal. oil; 1 gal. japan; 2 gal. turpentine; 1 gal. alcohol; 4 doz. sheets assorted sandpaper; 3 lb. steel wool; ¼ gal. metallic paint.
HARDWARE—4 cellar sash sets; 23 sash locks; 23 sash lifts; 1 transom sash set; 28 storm sash sets; 28 screen sets; 6 sets of shutter hardware for pairs; 1 front door set with butts; 1 rear door set with butts; 1 icing door set with butts; 2 storm door sets with butts; 2 screen door sets with butts; 1 floor hinge; 2 push plates; 11 inside door sets with butts; 14 door bumpers; 3 dozen clothes hooks; 4 stair rail brackets; 680 lb. sash weights; 1 coal chute; 7 hanks sash cord; 1150 lb. assorted nails; 6 lb. assorted brads; 1 set hardware for disappearing stairs. **Linen Closet:** 2 pr. ornamental butts; 1 cupboard turn; 1 elbow catch. **Hall Closet:** 1 pr. ornamental butts; 1 cupboard turn. **Medicine Cabinet:** 1 cupboard turn; 1 pr. ornamental butts. **Kitchen Cabinet:** 9 pr. ornamental butts; 5 cupboard turns; 4 blind catches; 1 set castors for bin; 1 bin pull; 5 drawer pulls. **Work Table:** 4 pr. ornamental butts; 2 cupboard turns; 2 elbow catches; 4 drawer pulls.

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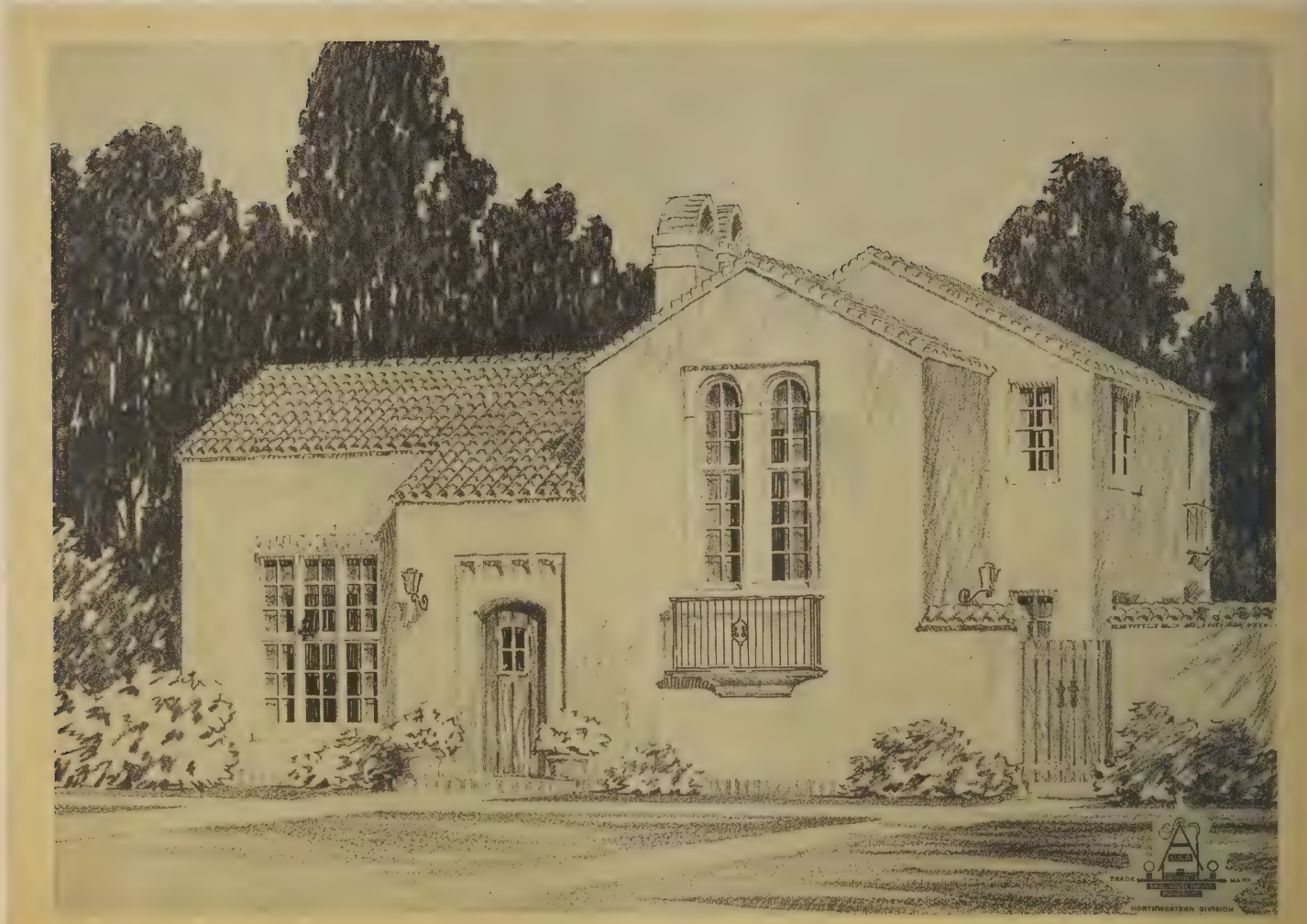
Details and quantity survey for House No. 6A63, designed especially for National Builder by The Architects' Small House Service Bureau

Southern Pine Standards Adopted in Architectural Construction

FOR many years the retail lumber dealers of New Orleans have been confronted with the difficulty of ordering their stock from the mills according to the standard Southern Pine Association grades and then filling the demands of the local trade on specifications entirely different. New Orleans was one of only a few cities in the United States that had its own specifications, which were adopted some fifty years ago and promulgated by the Contractors and Dealers Exchange.

The Southern Pine Association has, for some time, been bringing pressure on the local retailers to adopt their standard specifications, and the culmination of this was an announcement by a large majority of retail lumber dealers that in future they would abolish the old grading rules of the Contractors and Dealers Exchange, known as "New Orleans Special Grades," and instead, would handle Southern pine according to the association's standards.

The need then became apparent of taking some steps to familiarize architects, contractors and others interested with the new rules as compared with those previously used. A committee was accordingly formed, representing the Louisiana Chapter of American Institute of Architects, the General Contractors Association and the New Orleans retail lumber dealers. Every facility of the Southern Pine Association was afforded this committee in its work. After a large number of meetings, the committee worked out a schedule of specifications for the use of Southern pine in architectural construction, and the recommendations of the committee, together with its suggestions as to the kinds and grades of lumber to be used under the association rules in construction work generally, have been printed in pamphlet form. A copy of the booklet can be obtained without charge from the Southern Pine Association, Interstate Bank Building, New Orleans.



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A Spanish Type House with a Two-Story Living Room

Design No. 6A62, designed especially for National Builder by The Architects' Small House Service Bureau

SO many of our friends have asked for houses designed in the California style that we have prepared one. Home plan 6A62 is a delightful combination of Spanish and Italian influence on small house architecture.

The plan arrangement is new in this series. It is designed for a lot 50 feet or more in width, though if it is desired to turn the narrow end to the street it might be accommodated on a lot with a 40-foot frontage.

The construction is masonry foundations with hollow tile exterior walls finished with stucco and mounted with a tile roof. A brick base course appears at the grade to improve the appearance and durability of the stucco. The facing should be to the east or south. The plans should be reversed for a north or west facing.

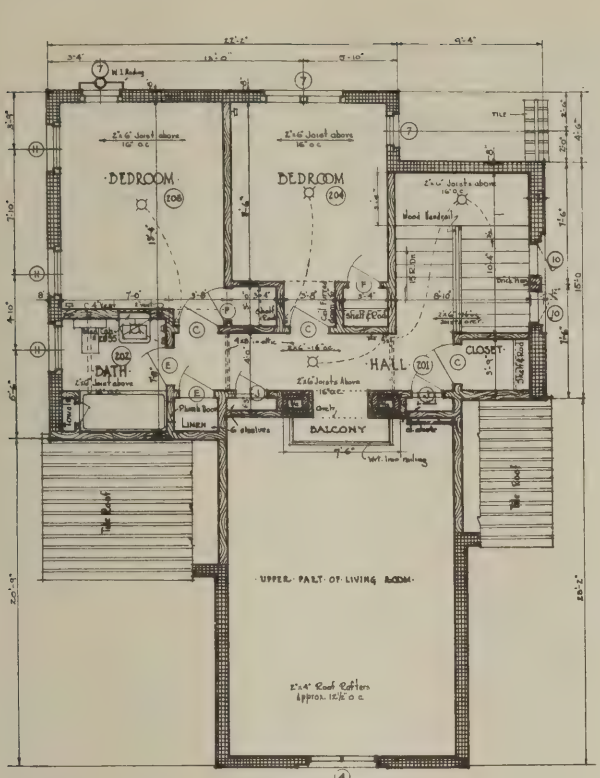
Perhaps the most distinctive feature of this house is the living room. You will see that it runs through two stories. The ceiling of this room is formed in part by the rafters. At one end is a handsome mantel and above it at the second story level there is a balcony opening out from a hallway. A beautiful effect could be obtained by draping tapestries over this rail.

Returning to the first floor you will see that the dining room is rather small. It is raised from the level of the living room by two steps. There are five casement windows in the dining room opening out on the terrace and garden. Directly in connection with this room is a modern kitchen with a rear porch. A large bedroom with a toilet completes the first story arrangement. A grade entry leads also to the basement.

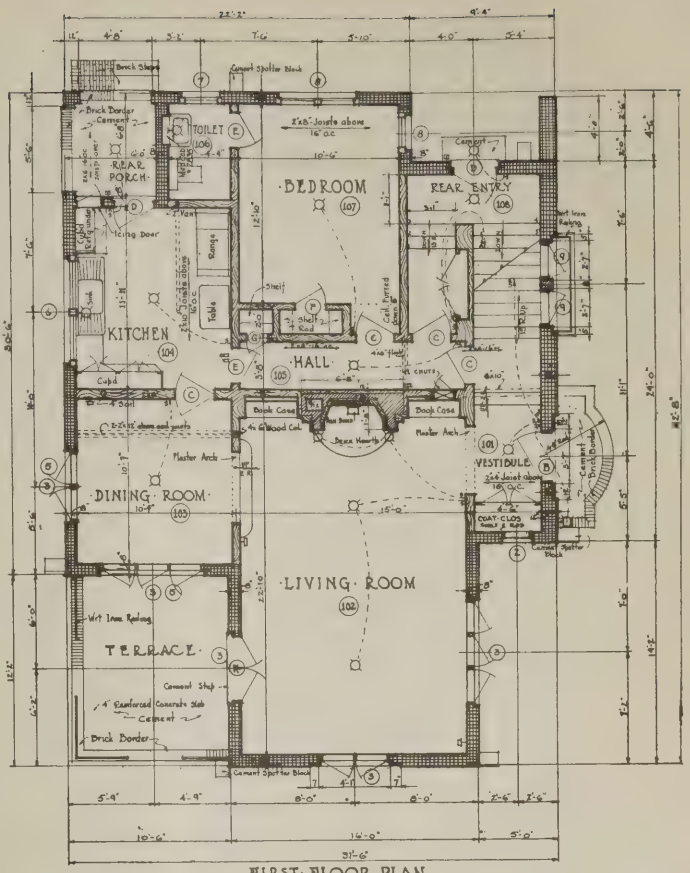
In the second story there are two bedrooms and bath. There are seven closets in this story.

The highly individual nature of this plan we are sure will appeal instantly to many people.

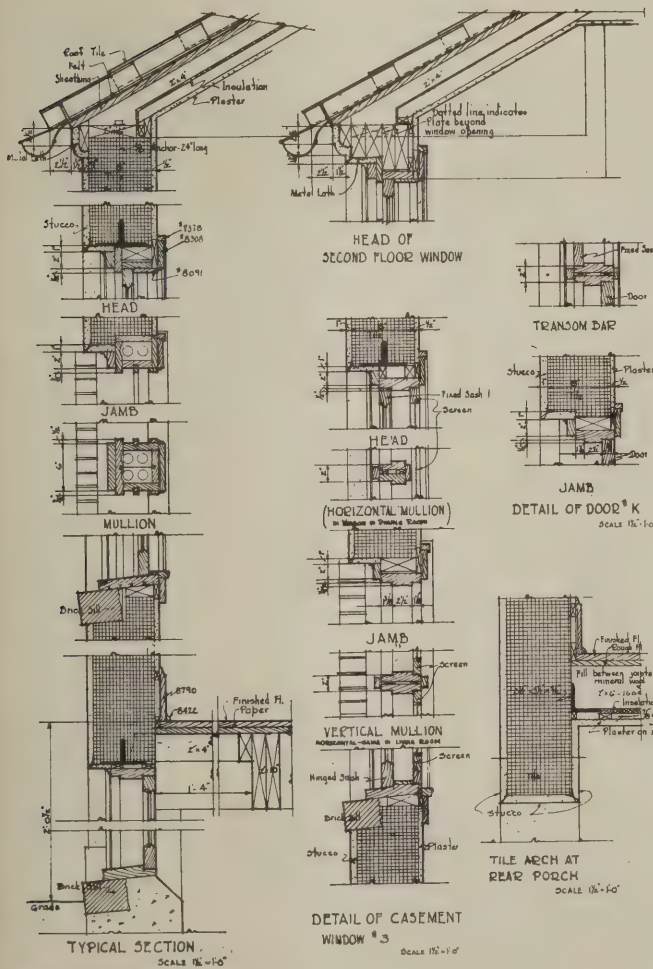
The regular price of the blue print plans of this design is $30.50 ($15.50 to NATIONAL BUILDER subscribers).

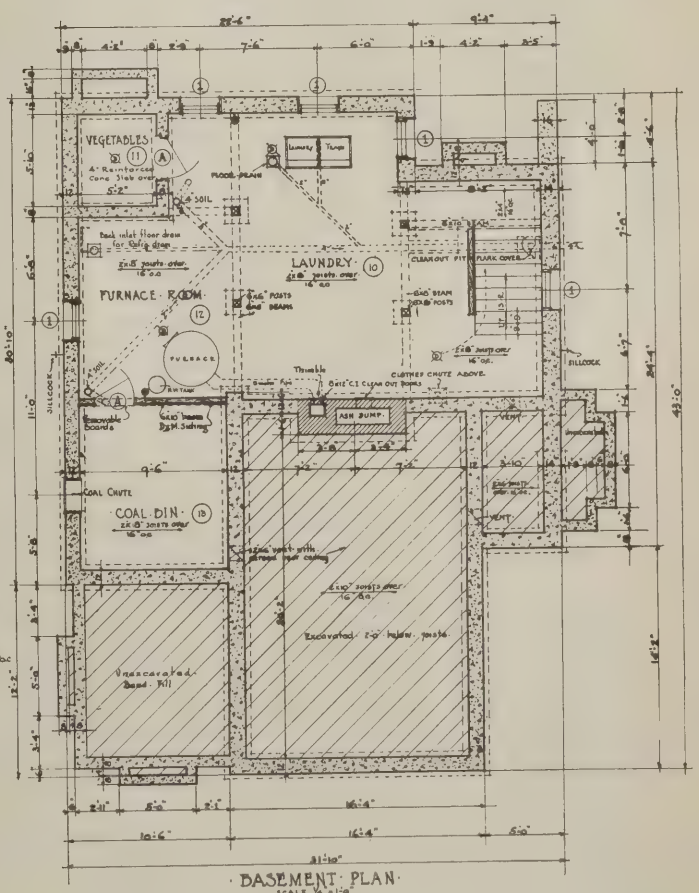


SECOND FLOOR PLAN
SCALE ¼"=1'-0"



FIRST FLOOR PLAN
SCALE ¼"=1'-0"





BASEMENT PLAN
SCALE ¼"=1'-0"

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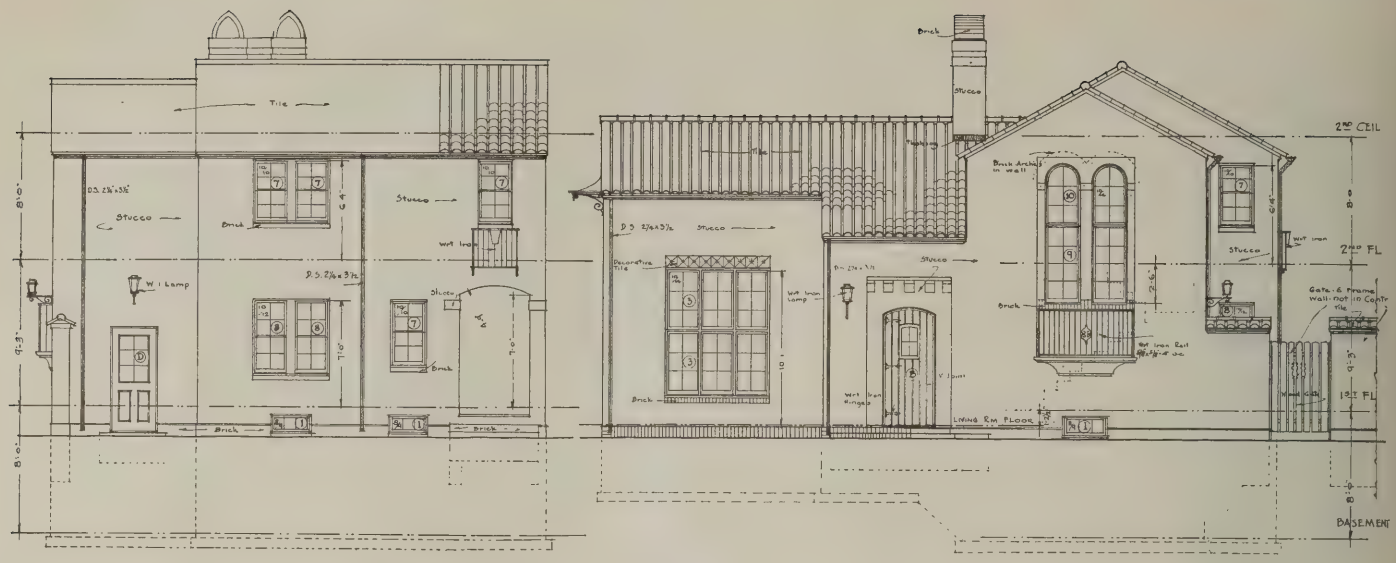
Plans and details for House No. 6A62, designed especially for National Builder by The Architects' Small House Service Bureau



SIDE ELEVATION

SCALE 1/8" = 1'-0"

FRONT ELEVATION

SCALE 1/8" = 1'-0"

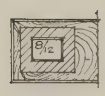
SCHEDULE OF DOORS

Quantity	Type	Size	Description	Remarks
2	A	2'-6" x 6'-8" x 1 3/8"	Univ "Flo	3 PANELS
1	D	3'-0" x 7'-0" x 1 3/4"	As DETAILED	GLAZED
6	C	2'-6" x 6'-8" x 1 3/8"	Univ "1102	INTERIOR
2	D	2'-8" x 6'-8" x 1 3/8"	CURTIS C-234	REAR
4	E	2'-4" x 6'-8" x 1 3/8"	Univ "1102	INTERIOR
3	F	2'-0" x 6'-8" x 1 3/8"	"	"
1	G	1'-4" x 6'-0" x 1 3/8"	"	"
2	J	2'-0" x 4'-0" x 1 3/8"	Univ "1102	INTERIOR
2	K	2'-1" x 6'-8" x 1 3/8"	Univ "1600	PERCH

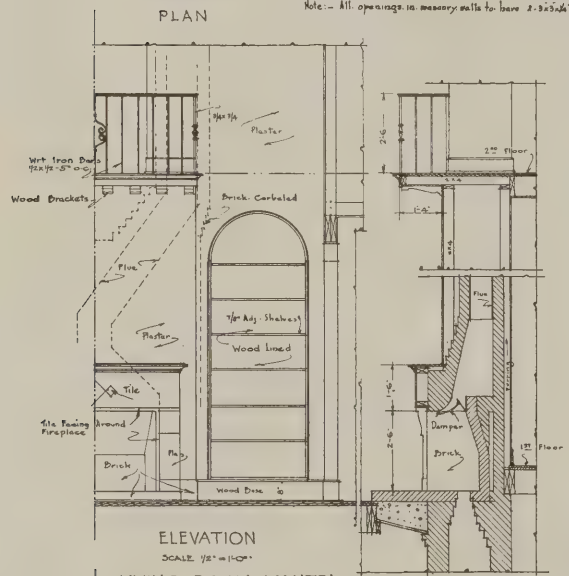
SCHEDULE OF WINDOWS

Quantity	Type	Description	No. of Lights	Size of Glass	Thickness of Sash	Frame
5	1	BASEMENT	3	8"x9"	1 3/8"	See detail
1	2	FIXED	1	16"x16"	"	"
17	3	CASEMENT	6	10"x14"	"	"
2	4	FIXED	4	16"x14"	"	"
5	5	FIXED	2	10"x10"	"	"
2	6	DOUBLE HUNG	6	10"x13"	"	"
5	7	" "	8	10"x10"	"	"
3	8	" "	8	10"x14"	"	"
2	9	CASEMENT	8	10"x14"	"	"
2	10	FIXED	6	10"x14"	"	" ARCH HEAD
3	11	DOUBLE HUNG	12	10"x10"	"	" "

Note:- All openings in masonry walls to have 2-3"x3"x1/4" L for lintel



PLAN

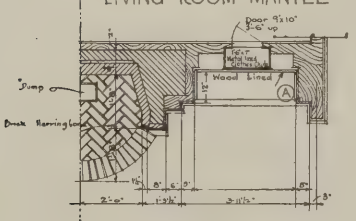


ELEVATION

SCALE 1/2" = 1'-0"

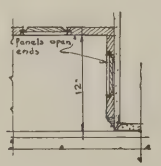
SECTION

LIVING ROOM MANTEL



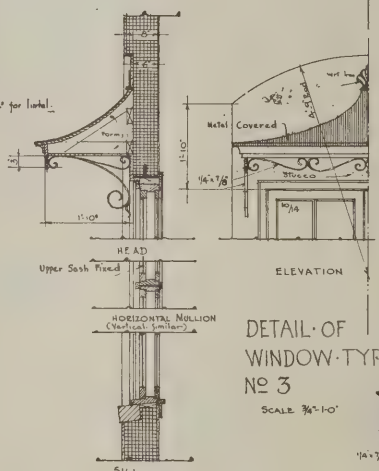
PLAN

SCALE 1/2" = 1'-0"



DETAIL L R BOOKCASE LINING at "A"

1 1/2" SCALE

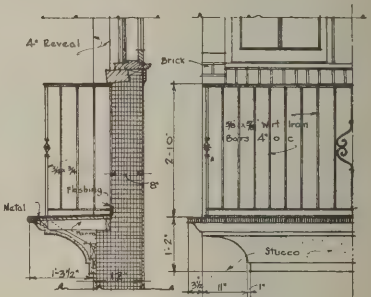


ELEVATION

SECTION

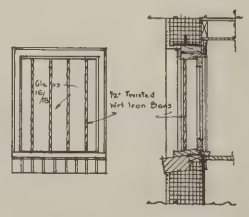
DETAIL OF WINDOW TYPE No 3

SCALE 3/4"=1'-0"



DETAIL OF BALCONY AT WINDOW TYPE No 9

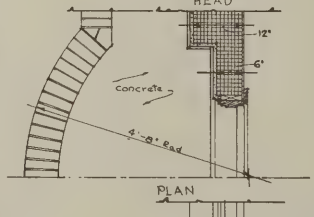
SCALE 3/4"=1'-0"

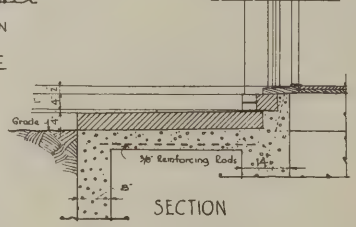


ELEVATION SECTION

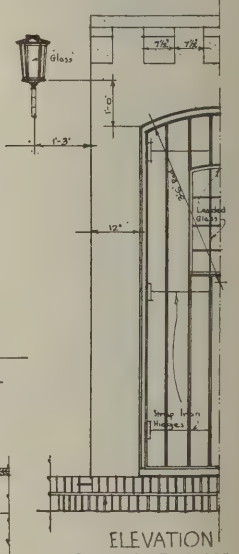
COAT CLOSET GRILLE

Scale 3/4" = 1'-0"





FRONT ENTRANCE



ELEVATION FRONT ENTRANCE

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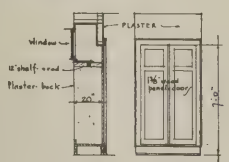
Elevation, details and door and window schedules for House No. 6A62, designed especially for National Builder by The Architects' Small House Service Bureau

REAR ELEVATION
SCALE 1/4"=1'-0"

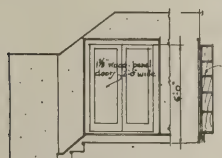
END ELEVATION
SCALE 1/4"=1'-0"

ELEVATIONS OF KITCHEN
SCALE 1/4"=1'-0"

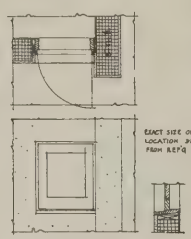
ELEV. IN BATH ROOM
SCALE 1/4"=1'-0"



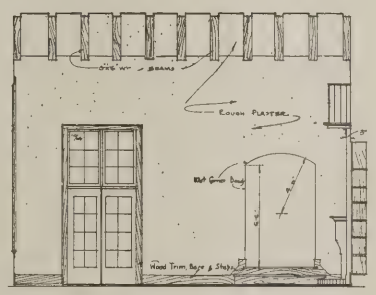
COAT CLOSET
SCALE 1/4"=1'-0"



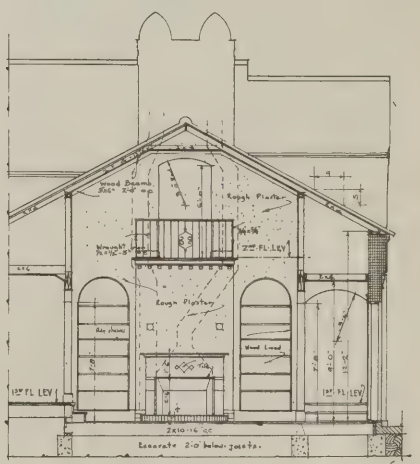
ELEV. OF CLOSET IN REAR HALL
SCALE 1/4"=1'-0"



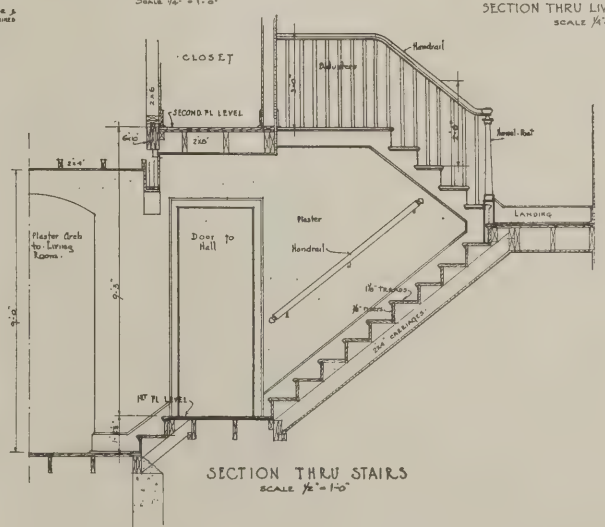
DET OF ICING DOOR
SCALE 1/2"=1'-0"



SIDE ELEVATION LIVING ROOM
SCALE 1/4"=1'-0"



SECTION THRU LIVING ROOM
SCALE 1/4"=1'-0"



SECTION THRU STAIRS
SCALE 1/2"=1'-0"

EXCAVATING—260 cu. yd.

BACKFILL—48 cu. yd.

FOUNDATION—If 12" concrete, 73 cu. yd. gravel, 294 sax cement; if 9" concrete, 56 cu. yd. gravel, 226 sax cement; if 12" tile, 35000 CBM tile, 26 cu. yd. mortar; if 9" tile, 29000 CBM tile, 22 cu. yd. mortar.

FACE BRICK—1200 brick; 70 lb. mortar color; 1 cu. yd. mortar.

CEMENT FLOOR—5 cu. yd. gravel; 4 cu. yd. sand; 56 sax cement; 5 spatter blocks.

TILE FOR OUTSIDE WALLS—29600 CBM tile; 13 cu. yd. mortar.

CHIMNEY—3000 common brick; 80 fire brick; 15 sq. ft. hearth tile; 140 inside face brick; 66 lin. ft. 8x12 flue tile; 20 lb. fire clay; 3 cu. yd. mortar; 1 cast iron ash dump; 1 throat and damper; 1 angle 4x3x5/16-4'0; 2—8x12 cleanout doors; 1—8" thimble; 2—6" adjustable thimbles; 5 yd. metal lath.

LATH—9 yd. metal lath over furnace; 7700 wood lath; 15 yd. metal lath for angles.

PLASTER—9 yd. plaster on metal lath; 270 yd. plaster on tile inside walls; 550 yd. plaster on wood lath; 25 yd. Keene's cement.

STUCCO—250 sq. yd. stucco on tile; 40 sq. yd. stucco on metal.

TILE FLOORS—96 sq. ft. ceramic tile; 44 lin. ft. cove base; 6½ sq. ft. decorative tile.

TILE INSERTS—2—4x4; 1—6x6 tile, for fireplace; 4—4x4 tile for end elevation.

ORNAMENTAL IRON—1 second floor rail 3'0; 6 lin. ft. front entrance rail; 4 sq. ft. wrought iron grille; 15 lin. ft. porch rail; 1 iron canopy 2'0x5'6; 1—7'0 interior balcony.

INSULATION—1300 sq. ft. ½" vegetable fibre or equal for roof; 3 rolls felt floors; 4 rolls felt roof.

REINFORCING STEEL—10—½" rods 12'0; 24—⅜" rods 10'0.

JOIST ANCHORS—32 joist anchors.

TILE ROOF—15 squares tile roofing.

LUMBER—Posts: 4—6x6-7; 1—6x8-18; 1—6x8-14; 54 lin. ft. 2x4 basement partition plates; 14—2x4-7 basement partition studs; 180 ft. D &

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Elevations, details and quantity survey for House No. 6A62, designed especially for National Builder by The Architects' Small House Service Bureau

M basement partition sheathing; 1—6x10-9 beam; 4 ft. 2" plank cleanout cover; 3—2x10-14 stair horses. **First Floor Joist:** 5—2x6-10; 15—2x8-10; 16—2x8-22; 10—2x8-10; 20—2x10-16; 420 lin. ft. 1x3 bridging. **Doubles:** 4—2x8-12; 2—2x10-16; 1200 ft. boards first floor subfloor; 1400 ft. 13/16x 1½ first floor finish floor; 378 lin. ft. 2x6 first floor partition plates; 112—2x6-9 first floor partition studs; 3—2x10-16 stair horses. **Second Floor Joist:** 9—2x4-5; 12—2x8-9; 16—2x8-12; 10—2x6-7; 20—2x10-12; 1—6x10-10 beam first floor; 2—2x12-12 beam; 1—2x10-10 step horses; 600 ft. com. bds. second floor subfloor; 770 ft. 13/16x 1½ second floor finish floor; 366 lin. ft. 2x4 second floor partition plates; 100—2x4-8 second floor partition studs. **Second Floor Ceiling Joist:** 18—2x6-16; 7—2x6-12; 8—2x6-10; 8—2x4-5; 20—2x 4-6. **Rafters:** 18—2x4-22; 24—2x4-10; 36—2x4-12; 18—2x4-10; 1800 ft. D & M roof sheathing; 20—2x4-16 lookouts; 1200 lin. ft. grounds; 4—2x4-14 headers. **Scaffold and Extras:** 20—2x4-16; 6—2x 8-14; 9—2x10-16; 8—2x12-14.

MILLWORK—Frames: 5 single 8x9-3L-1⅜; 1 single 16x18-1L-1⅜; 1 mul. casement 10x14-6L; transom 10x10-2L; 1 double 2'1x6'1¾; tr. mul. 10x14-6L-1⅜; 1 triple 10x14-6L-1⅜; transom 10x 10-2L; 1 mul. 10x14-6L-1⅜; tr. over 10x14-6L; tr. over 10x14-4L; 1 triple 10x14-6L-1⅜; triple tr. over 10x14-6L-1⅜; 1 mul. 10x15-6L-1⅜; 1 mul. 10x10-8L-1⅜; 3 single 10x10-8L-1⅜; 1 single 10x12-8L-1⅜; 1 mul. 10x12-8L-1⅜; 2 single 10x14-8L-1⅜; 2 single 10x14-6L-1⅜ arched heads; 3 single 10x10-12L-1⅜. **Sash and Windows:** 5 cellar sash 8x9-3L-1⅜; 1 sash 16x18-1L-1⅜; 17 casements 10x14-6L-1⅜; 2 sash 10x14-4L-1⅜; 5 sash 10x10-2L-1⅜; 2 wd. 10x15-6L-1⅜; 3 wd. 10x12-8L-1⅜; 5 wd. 10x10-8L-1⅜; 2 casements 10x14-8L-1⅜; 2 sash 10x14-6L-1⅜, arched heads; 3 wd. 10x10-12L-1⅜. **Storm Sash:** 5—8x9-3L-1⅛; 1—16x18-1L-1⅛; 17—10x14-6L-1⅛; 2—10x14-4L-1⅛; 5—10x10-2L-1⅛; 2—10x15-6L-1⅛; 5—10x10-8L-1⅛; 3—10x12-8L-1⅛; 2—10x14-8L-1⅛; 2—10 x14-6L-1⅛; 3—10x10-12L-1⅛. **Screens:** 5—8x9-3L-1⅛; 1—16x18-1L-1⅛; 17—10x14-6L-1⅛; 2—10x14-4L-1⅛; 5—10x10-2L-1⅛; 2—10x15-6L-1⅛; 5—10x10-8L-1⅛; 3—10x12-8L-1⅛; 2—10x14-8L-1⅛; 2—10x14-6L-1⅛; 3—10x10-12L-1⅛. **Outside Door Frames:** 1—3'0x7'6-1¾; 2—2'8x6'8-1¾; 1 icing door frame. **Outside Doors:** 1—3'0x7'6-1¾ glazed; 2—2'8x6'8-1¾ (No. C239); 1 pr. 2'1x6'0-1¾ (No. 1600); 1 icing door. **Storm Doors:** 1—3'0x7'6-⅛; 2—2'8x6'8-1⅛; 1 pr. 2'1x6'0-1⅛. **Screen Doors:** 1—3'0x7'6-1⅛; 2—2'8x6'8-1⅛; 1 pr. 2'1x6'0-1¼. **Exterior Millwork:** 192 lin. ft. cornice; 1 wood louvre frame; 1 louvre sash; 1 louvre screen; 1 wood gate. **Interior Doors:** 2—2'6x6'8-1⅜ (No. 720); 6—2'6x6'8-1⅜ (No. 1102); 4—2'4x6'8-1⅜ (No. 1102); 3—2'0x6'8-1⅜ (No. 1102); 1—1'4x6'8-1⅜ (No. 1102); 2—2'0x4'0-1⅜ (No. 1102). **Jambs:** 2—2'6x6'8; 6—2'6x6'8; 4—2'4x6'8; 3—2'0x6'8; 1—1'4x6'8; 2—2'0x4'0. **Interior Trim:** 5 single side trim 8x9-3L; 1 single 16x18-1L; 1 mul. side 10x14-6L; tr. 10x10-2L; 1 side for double dr. fr. 2'1x6'0, tr. mul. 10x14-6L-1⅜; 1 side for triple 10x14-6L; tr. 10x10-2L; 1 side for mul. 10x14-6L; transom 10x14-6L, tr. over 10x14-4L; 1 side for triple 10x14-6L; transom 10x14-6L; 1 mul. side 10x15-6L; 1 mul. side 10x10-8L; 3 single side 10x10-8L; 1 single side 10x12-8L; 1 mul. side 10x12-8L; 2 single side 10x14-8L; 2 single side 10x14-6L arched heads; 3 single side 10x10-12L; 1 side door trim 3'0x7'6; 2 side door 2'8x6'8; 1 side icing door; 4 side 2'6x6'8; 12 side 2'6x6'8; 8 side 2'4x6'8; 6 side 2'0x6'8; 2 side 1'4x6'8; 4 side 2'0x4'0; 1 flight basement stairs; 1 flight main stairs with rail; 1 living room step bull nose 6'0; 2 clothes chute doors, jambs and trim; 1 mantel shelf; 2 bookcases 3'2; 1—4'0 clothes cupboard; 2 medicine cabinets (No. 2835); 1—3'0 ice box cupboard; 2 drain boards; 1—3'0 drop table; 1—5'6 kitchen cupboard; 1 towel cabinet; 1 utility door; 1 utility door jamb; 1 side trim; 1 meter cabinet; 650 lin. ft. base; 650 lin. ft. base shoe; 650 lin. ft. base molding; 30 lin. ft. closet shelving; 40 lin. ft. closet hook strip; 20 lin. ft. closet clothes rod; 208 lin. ft. beam ceiling; 44 lin. ft. ceiling cove; 320 lin. ft. picture molding; 12 lin. ft. threshold; 50 lin. ft. band molding; 1 rear hall cabinet.

TINWORK—100 lin. ft. gutter; 16 gutter ends; 30 hangers; 7 nipples; 7 elbows; 7 shutoffs; 7 strainers; 106 lin. ft. conductor; 21 conductor hooks; 2—8x6 vents; 1 clothes chute lining; 12 lin. ft. valley tin; 6 sheets sheet tin; 20 lin. ft. chimney flashing; 2 wrought iron lanterns.

WEATHER STRIPPING—5 sash 8x9-3L; 1—16x18-1L; 17—10x14-6L; 2—10x14-4L; 5—10x10-2L; 2 wds. 10x15-6L; 5—10x10-8L; 3—10x12-8L; 2 sash 10x14-8L; 2 sash 10x14-6L; 3 wds. 10x 10-12L; 1 double dr. 2'1x6'0; 1 dr. 3'0x7'0; 2 dr. 2'8x6'8.

CAULKING—1 coal chute; 1 double door frame; 3 single door frames; 1 icing door frame; 17 single frames; 6 mullion frames; 2 triple frames.

HARDWARE—5 cellar sash sets; 26 casement sash sets with butts; 13 sash locks; 13 sash lifts; 47 storm sash sets; 47 screen sets; 1 double door set with butts; 1 front door set with butts; 2 rear door sets with butts; 1 icing door set with butts; 3 single storm doors sets with butts; 1 double storm door set with butts; 1 double screen door set with butts; 3 single screen door sets with butts; 1 set gate hardware with butts; 1 pr. hinges for louvre sash; 1 hook and eye for louvre sash; 1 floor hinge; 2 push plates; 17 inside door sets with butts; 24 door bumpers; 4 dozen clothes hooks; 4 stair rail brackets; 1150 lbs. assorted nails; 24 anchor bolts with nuts and washers; 400 lbs. sash weights; 3 hanks sash cord; 1 coal chute. **For Clothes Chute Door:** 2 pr. spring hinges; 2 cupboard turns. **Clothes Cabinet:** 2 pr. ornamental hinges; 1 cupboard turn; 1 elbow catch. **Medicine Cabinets:** 2 pr. ornamental butts; 2 cupboard turns. **Ice Box Cabinet:** 4 pr. ornamental butts; 2 cupboard turns; 2 elbow catches. **Kitchen Cabinet:** 1 set castors; 1 bin pull; 9 pr. ornamental butts; 5 cupboard turns; 4 elbow catches; 6 drawer pulls. 1 set drop leaf table brackets; 4 friction stays—utility door. **Meter Cabinet:** 1 pr. ornamental butts; 1 cupboard turn. **Rear Hall Cabinet:** 2 pr. ornametal butts; 1 cupboard turn; 1 elbow catch. **Towel Cabinet:** 1 pr. ornamental butts; 1 cupboard turn. 6 lbs. assorted brads; 6 lbs. steel wool; 4 doz. sheets assorted sandpaper.

EXTERIOR PAINTING—2 gal. trim paint; 1 gal. metal paint; 1 gal. sash color; 1 gal. screen paint; 1 gal. st. sash paint; ½ gal. outside varnish; ½ gal. stain.

INTERIOR PAINTING—11 gal. white paint; 8 gal. enamel; 5 gal. filler stain; 3½ gal. shellac; 9 gal. varnish; 3 gal. floor shellac; 6 gal. floor varnish; 1 gal. oil; 2 gal. japan; 2 gal. turpentine; 1 gal. alcohol; 6 lbs. color in oil.

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Crowd Building Trades Courses

ANOTHER jolt for "the white-collar job" is seen in the announcement from Carnegie Institute of Technology, Pittsburgh, that, of the 1200 night students enrolled for the present year in the College of Industries, 50 per cent have signed to take courses in the building trades. This division of students is viewed with unusual significance by officials of the institute as representative of a growing tendency among the young men of Pittsburgh to learn craftsmanship.

Moreover, according to the report, the increased interest in the building construction courses is confined to no one branch of the industry, but is reflected in each department offering building courses. In some of the departments, the number of students enrolled for the present year is 200 to 300 per cent larger than for the previous year.

The courses in carpentry and in electrical equipment and construction report the heaviest gains, especially in new students. Of the 60 or more carpentry students enrolled up to a few days ago, more than 40 were new students, while the department of electrical equipment and construction enrolled more than 60 new and more than 50 former students. The reason for the heavy enrollment of would-be electricians and carpenters this year is attributed by Carnegie Tech authorities to the high wage scales at present in force in these branches of work. Another reason, somewhat indirectly responsible but nevertheless noticeable, is due to the growing interest that labor unions are showing in educational facilities for their respective apprentices. A striking example of this attitude by the unions was revealed in the recent action of the local union of the International Wood-wire and Sheet Metal Lathers Union which, on its own initiative, has effected a working agreement with Carnegie Tech to train apprentices of this trade. As a result of this agreement, about 15 apprentices attached to the local sheet metal lathers union have enrolled at the institute, and are compelled by the union to attend a special night course three nights a week for the next two years.

While the action of the sheet metal lathers is the only official agreement that has been announced by the institute, several other unions in the allied building trades have taken steps to require night school attendance of their respective apprentices.

High enrollment figures for the year are also reported by the Department of Heating, Ventilation and Sanitation, where courses in plumbing, welding and estimating have attracted about 75 students ranging from apprentices to contractors.

Evidence that many skilled tradesmen in various industries are ever waiting for educational opportunities is seen at Carnegie Tech by the unusually high registration of journeymen sheet metal workers for courses in the sheet metal department. For the first time this year, this department announced a group of special courses for journeymen workers, with the result that the majority of the students this year identify themselves as journeymen.

In the courses in masonry and concrete work, the percentage of expansion over last year has been equally high commensurate with other building construction departments. This division reports more than 30 students.

Adherents to the desirability of "the white-collar job" may find some consolation in the fact that the more than 50 students registered in structural drawing, and an equally large number enrolled in architectural drawing, represent substantial increase also, but according to Dr. T. S. Baker, president of Carnegie Tech, many of the drawing students are skilled craftsmen.

Although the increase in night students this year in the Industries College is unusually large, similar degrees of expansion, it is reported, have occurred in the College of Engineering, and in the College of Fine Arts. The new students in the Engineering College are made up largely of high school graduates who have been denied the opportunity to attend college in the day-time, and are taking night engineering courses, as the next best thing. Several departments in the Fine Arts College have found it necessary to curtail enrollments, in order to keep classes within capacity.

Modern Space Economizing Apartment Building

A Twelve-Apartment Building at Huntington, West Virginia, Is a Happy Combination of Comfortable Arrangement and Economical Room Layout

THE present day tendency in apartment buildings is more toward the smaller "hotel" type of apartment than to the large seven- and eight-room apartment of former days. It is difficult to give any good reason why this state of affairs should exist but since these small apartments have come into popular favor the demand must be satisfied, and they are being built in ever increasing numbers.

The building illustrated here is three stories high and contains twelve apartments, four on each floor. It is built of dark-red face brick, not in the "shirt-front" fashion, but with face brick on the sides as well as the front. White-painted wood trim and cut stone are effectively worked into the design of the front elevation so that the building presents a striking appearance even when viewed from a distance. The balconies and front entrance are a dominating note in the ornamentation of the front.

The apartments are of the "three-room" type but, by the use of disappearing beds, they actually possess the efficiency of five rooms. Each apartment contains a sun-parlor, living room, combination dining room and kitchen, bath, dressing room, linen closet and two bed closets. The bed closets, besides providing storage space for the beds when they are not in use, furnish plenty of additional room for clothes storage. An incinerator opening is located on each floor so that it is readily accessible from the kitchens of all four apartments. Thus the problem of garbage disposal is very effectively solved.

All apartments open from a main hall which runs the length of the building. Notice that each apartment contains two entrances, one through the living room and the other through the kitchen. This is a great convenience since it permits going in and out of the service part of the apartment without entering the living rooms.

Entrance to the living room is through a small vestibule. This is unusual as most apartments of this type open directly from the hall into the living room. The advantages of the vestibule are many, not the least of which is the additional privacy it affords. The linen closet, which opens from the vestibule may be used as a closet for guests' wraps.

Front entrance detail. The brick panel directly above the entrance cornice adds much to the effectiveness of the design

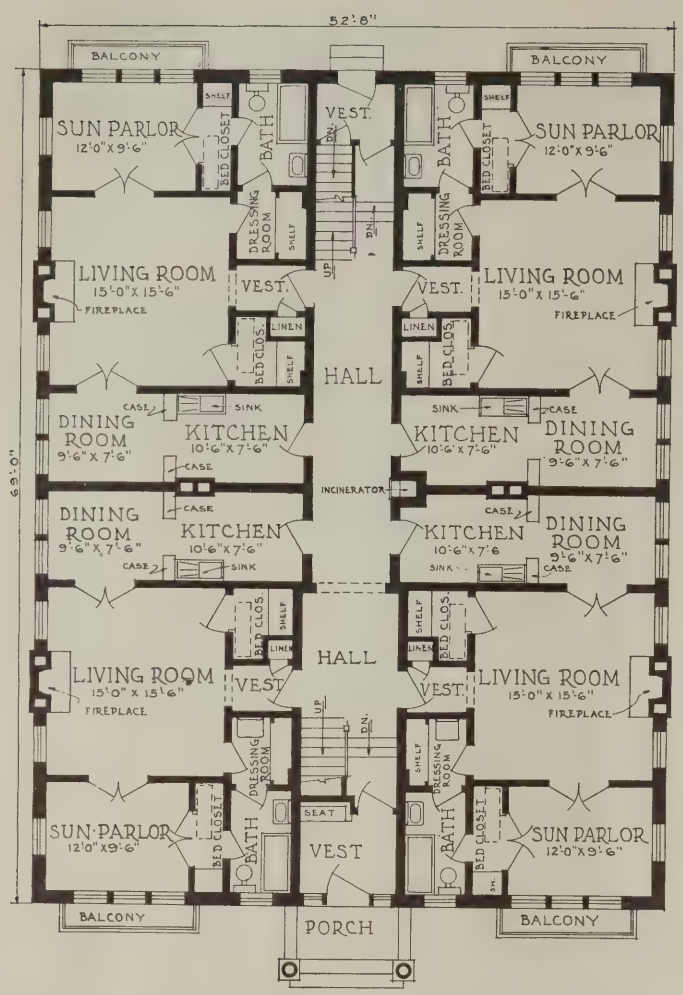
General view of the apartments. The white trim and green tile roof give the building a striking appearance even when viewed from a distance. Notice the louvre which furnishes ventilation to the space between the roof joists. Notice also that this is not a "shirt-front" building; the face brick runs all the way around. See following page for floor plan

An important feature of the layout of these apartments is the fact that for small quarters, the degree of privacy provided is unusual. Notice the sleeping arrangements. One bed is located in the living room and the other in the sun parlor, and these two rooms can be separated from each other by closing the sun parlor doors. Access to the bathroom may be had either through the door in the sun parlor bed closet, or from the living room by way of the dressing room. Although two doors to a bathroom are generally undesirable, the idea works out very well here.

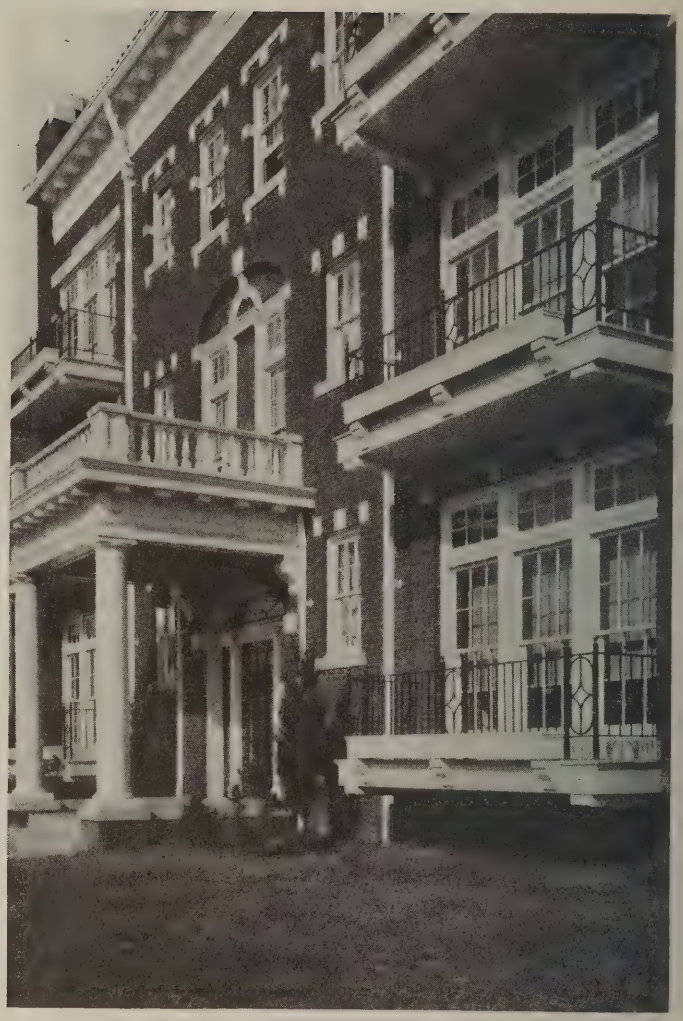
The balconies, which are a prominent feature of the exterior, are desirable adjuncts to the sun parlors of the front suites.

The dining room and kitchen are separated from each other by a low case, and the dining room is cut off from the living room by a pair of French doors. This feature, in connection with the kitchen door which opens on the hall, allows a complete separation of the service and living quarters.

On the whole, the economy of plan, the size of the rooms, and the degree of privacy afforded are unusual for this type of apartment, and this layout would seem to be an excellent solution of the small apartment problem. A. F. Dickey of Huntington, West Virginia, was the architect and the building was erected by F. S. and C. A. Loar, of the same city.



A typical floor plan showing the room layout



A side view showing the entrance and the balconies

Group Heating

PUTTING an entire city or suburb under glass, heating it as a giant conservatory, enclosing a half-mile district, having a Palm Beach atmosphere maintained constantly by means of the most improved air conditioning and ventilation equipment, thereby doing away with such annoyances as ashes, radiators, piping, rain on wash days and innumerable other present-day hardships, is the unique idea of Samuel R. Lewis, a member of the American Society of Heating and Ventilating Engineers, and a successful consulting engineer of Chicago. The following are extracts from a paper presented before the Illinois Chapter, by Mr. Lewis, and published in the November issue of the "Journal" of that society:

"Why not house the various nondescript buildings with a great, permanent, highly insulated, well lighted structure, making group heating as ordinarily interpreted an anachronism, heating instead to a comfortable degree the neighborhood?

"Most rooms in buildings get direct sunshine for a few hours only each day. If we have a lofty building with properly oriented skylights we will get a brilliant spray of sunshine over all of its area, either in the morning or in the afternoon, and the lighting and health should, so far as sunshine is concerned, be first class.

"If we build this structure of the highest reasonable grade of construction now commercially possible, we might make the structures within its shelter the lightest of shells, built for privacy only. If the enclosure is lofty, no mechanical ventilation will be required, as the difference in temperature between the enclosure and outdoors will cause a rapid air change. Dust, temperature, humidity and even air motion can be controlled by artificial showers of rain, whenever these are needed, from sprayheads in the roof. Ponds of water may be utilized on the roof for their benign value in temperature regulation. Substantial reductions in the cost of living can be made by the garden truck which can be grown on the inner roofs and in the back yards. Anyone who wishes cold air may dress for it and pass outside, but under ordinary circumstances people will wear light clothing and should be free from colds, as they suffer no extremes of temperature.

"There are many applications of this idea of neighborhood heating which are so radical as to involve material changes in our accustomed routine of civilization. There are applications as in housing over a narrow valley, which would be for purposes of comparison unfair on the basis of first cost and maintenance. A circular structure, quite lofty, with heavily insulated outside walls and windows and open to a great central court would be the most economical construction, in all probability, except for the ground space occupied. It has interesting possibilities.

"The structure, with its heating, would cost not to exceed $2.50 per square foot of area, or $16,735,000. All work done inside the structure will cost much less than the same work outside, because work can be carried on every day, regardless of outside weather conditions.

"As an apartment proposition, therefore, such an institution as I have suggested is an economical financial possibility today. The owners would save enough in coal alone to create a substantial sinking fund and pay the interest on all that the project would cost beyond conventional structures.

"I'll grant that it may be a few years before my sixteen-million-dollar half-mile-square project will be floated but I predict that the roofing over of streets in metropolitan districts will come quickly. The saving in heat will finance the construction."

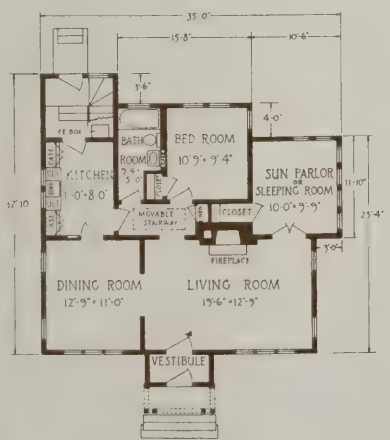
National Builder
STYLE SHEET

A Departure from the Stereotyped Bungalow Style

THE plan is good, but it is the design of this house that is unusual. That is what makes over half the people who walk or drive by it stop to look at it. That is what enabled its builder to sell it within four days after he put it on the market.

The plan here provides a large living room, with a sun parlor which can be used as a bedroom if desired. A disappearing stairway in the ceiling of the hall provides convenient access to the attic space which is lighted and ventilated by the windows in the dormers and gables, and which has room for storage and an emergency bedroom.

This house was built by Sigwald Johnson in River Forest, Illinois.

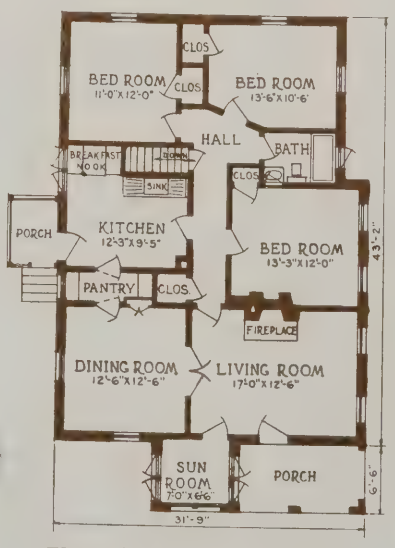


Above, floor plan; right, rear view

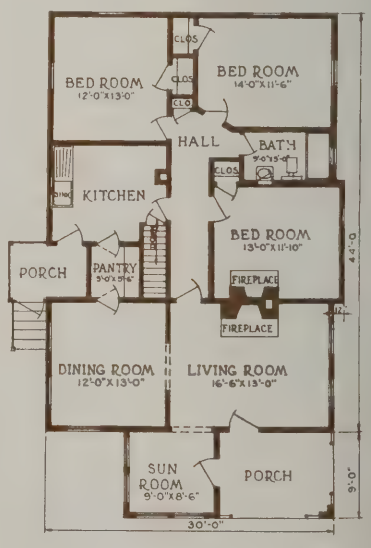
A Six Room Bungalow in Brick, with Two Possible Floor Plans of About the Same Size

NATIONAL BUILDER has shown in the "Style Sheet" several of the individual houses in the group designed by Barber & McMurray, architects, in Knoxville, Tennessee, whose work was fully described in the issue of July, 1923. Here is another of their small houses—a bungalow built in brick with wood shingles used to trim the gables of the house and porch.

Two floor plans are shown. The one on the left is of the bungalow as it was actually built; the one on the right is an alternate plan suggested by the architects. In the one the basement stairway is accessible from the hall; in the other, from the kitchen. A small breakfast nook is provided in the actual plan; a larger pantry and a partly enclosed service porch in the alternate plan. The house as built has a hall closet (for coats) off the living room; there is a linen closet in the back hall of the alternate layout. The room sizes vary a little in the two plans, but in most respects they are alike. Both provide a fireplace not only in the living room but also in the front bedroom. Both fireplaces utilize the same chimney. The two rear bedrooms have light and ventilation from two sides, while two windows are provided in the one outside wall of the front chamber. French doors or a cased opening can be used between the living and dining rooms. The location of the pantry between the kitchen and dining room is a good arrangement, for it keeps the dishes and supplies handy.

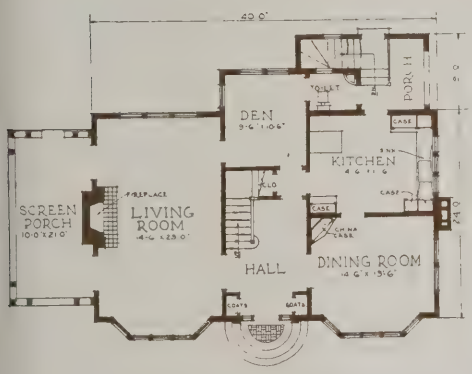


Floor plan of the bungalow as it is built



Alternate floor plan as it could be built

A Dutch Colonial House in Walla Walla, Washington, Which Has Many Modern Features and Built-in Equipment



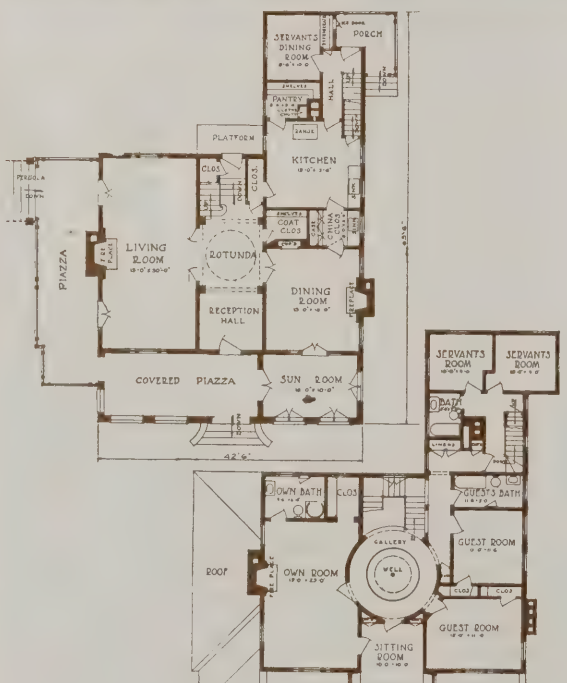
First floor plan

Second floor plan

LACK of space prevents showing photographs of all the equipment and interior vistas in this modern home in Walla Walla, Washington, which was designed and planned by H. E. Crawford, architect. Below, however, are views of the fireplace and mantel in the living room and the china closet, built-in across one corner of the dining room. The kitchen is particularly well planned and equipped. The exterior photograph shows the appearance of four-inch beveled siding on a house of the Dutch Colonial style.

The fireplace in the living room

The china closet in the dining room



Above—First floor plan. Below—Second floor plan

A House in the Italian Style, with an Interesting Plan, in North Scituate, Massachusetts

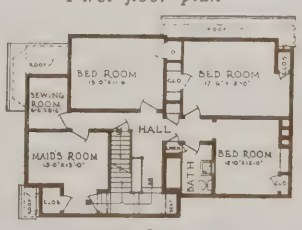
THIS is "Glan-y-mor," the residence of Mr. George Hawley, North Scituate, Massachusetts. It was designed by Little & Browne, architects, Boston. The exterior is in the Italian style, with stucco and tile roof. The modillioned cornice and the finials over the porch and sitting room are the only ornamental details and with arches in the front porch and sun room add much to the attractiveness of the house. The design suggests a good treatment of the common square or nearly-square plan with hip roof. This plan, however, is not common. With its many closets, bathrooms and servants' rooms, and the rotunda extending through the house, it is unusually interesting. The front porch or piazza is under a roof; the piazza along the living room side is not, but the owner has enclosed it with screens and canopies, adding color and interest to the exterior in the summer, and when removed in winter abundant light reaches the living room. The sun room is a year-round room with large windows. Upstairs, the owner's room has a private bath with a sitting room adjacent and accessible to the gallery that serves as the second floor hall.

Taking Advantage of a Lot That Slopes to the Rear with a House of Good Plan and Design, in Davenport, Iowa

LIKE many other towns along the Mississippi River, Davenport, Iowa, has many streets that run uphill and down and that cut into slopes of varying degrees. The house of Mr. O. F. Priester, a contractor in that city, is situated on a lot that slopes to the rear. Advantage has been taken of this fact in the plan and design of the house. The architects were Clausen & Kruse. The exterior is in the English style with stucco, and half timbers are used with restraint. The roof is asbestos shingles. The living room, dining rooms and porch downstairs and the principal bedrooms upstairs are placed in the rear of the house, not only to give them privacy but also to have them overlook the vista in the rear, which is very pleasant. The basement, accordingly, gets abundant light and there is even room enough for a two-car garage below the breakfast room and pantry. The breakfast room is a desirable feature of this plan. The living room has windows on three sides. Cased openings between it and the hall and dining room enhance its size. Upstairs there are four good-sized bedrooms with a possible second bathroom in place of the sewing room shown on the plan. The stairway leads directly into the maid's room and to the main hall. This arrangement permits a stairway to the attic, which is an important part of the house, as seen in the end view illustration.

End view

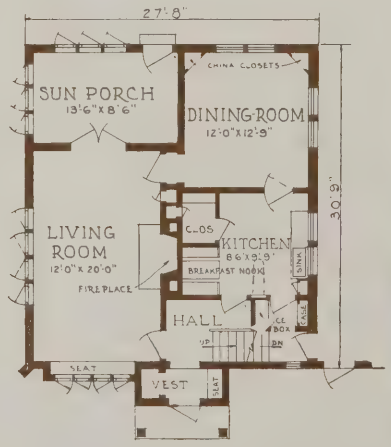
First floor plan



Second floor plan

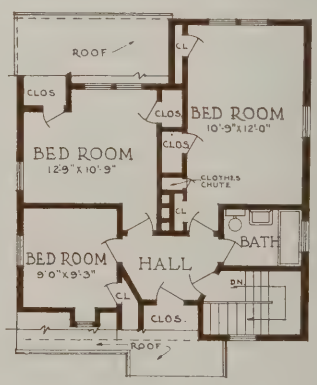
Face Brick and Asbestos Shingles Bring Out the Beauty of This House

AN architect in Richmond, Indiana, built this attractive little house for his own family. He is Mr. Paul Werking. His example should have a stimulating effect on all home-building in his city. He has made successful use of face brick for the exterior, the handling of the entrance over-door and the bay window being of particular interest. Asbestos shingles are used for the roof. The plan is a compact arrangement of six rooms with a breakfast nook and large sun porch.



First floor plan

A view of the other side showing the dormers that give windows to the bathroom and owner's bedroom



Second floor plan

Open bookshelves at each side of the simple Colonial mantel form a most inviting room-end for the living room. Fluted pilasters and well-proportioned moldings are the only ornaments. Notice the French paneling on the walls

Mantels Worthy of the Hearth

By H .T. Becker

IF there is one feature of housebuilding that is brought home to us all, with considerable force, on a given day each year, that day is Christmas, and that fact is that no house ever will be perfect that lacks a fireplace. A matter involving sentiment, surely, but with a practical side as well, as every successful builder knows, for often it is the fireplace which helps sell the house or makes a satisfied customer. The fireplace long ago ceased to be the very pivot of each new-built house, as it was in Colonial days, when every room in the house was built against the central chimney and partook of its comfort. There is even a house still standing at Newburgh, New York—where Washington made his headquarters during the Revolution—where there is merely an opening in the roof instead of a chimney enclosed between walls. The function of the fireplace has changed considerably since those days. No longer do we depend upon a device so primitive and inefficient to keep our homes comfortably warm in winter. But there is the warmth for chilly morning or raw evening without the expense of starting the main heating system; there is the fact that the air of the room is changed from four to eight times each hour, according to the amount of draft; there is its decorative value, and the need of a central point in the furnishing of the room; there is the friendliness and the family spirit of a flickering firelight on the hearth, which will never be replaced by any artificial means.

This type of fireplace is by all means the one for the Spanish mission house. Its proportions are an exception to the rule of "wider than high." A single heavy hand-hewn timber forms the lintel. Note the symmetrical placing of the stone blocks

Of course, the one room which cannot be true to its name without provision for an open fire, is the living room. Another, for hospitality, in the dining room is desirable; and one in the main bedroom is a pleasant luxury if it can be afforded. The sort of treatment given the fireplace should always take into consideration the room in which it is placed, as well as the architectural type of the house itself—the simplest treatment for the less public rooms, and great elaboration permissible only in the great halls and living rooms of the most pretentious residences.

There are certain fundamental principles that apply to all fireplaces, and which are well worth remembering. The facing and hearth may be firebrick, or stone, cement, marble, or tiles; the brick, tile and marble in light colors being most appropriate for Colonial houses, and the dark marbles and brick, and cement for English type homes. For Italian, Spanish, and Mission or rustic schemes, stone, rough-finished cement and brick are most effective. Practically all of these require some wood trim, the kind of wood being the same as that used in the

There is a charm about a fireside settee, even though it may be less comfortable than it appears. The drawer or door below can open into a wood-box that can be filled from the basement. The mantel itself is an excellent design, whose motifs are centuries old, and may be found in many variations

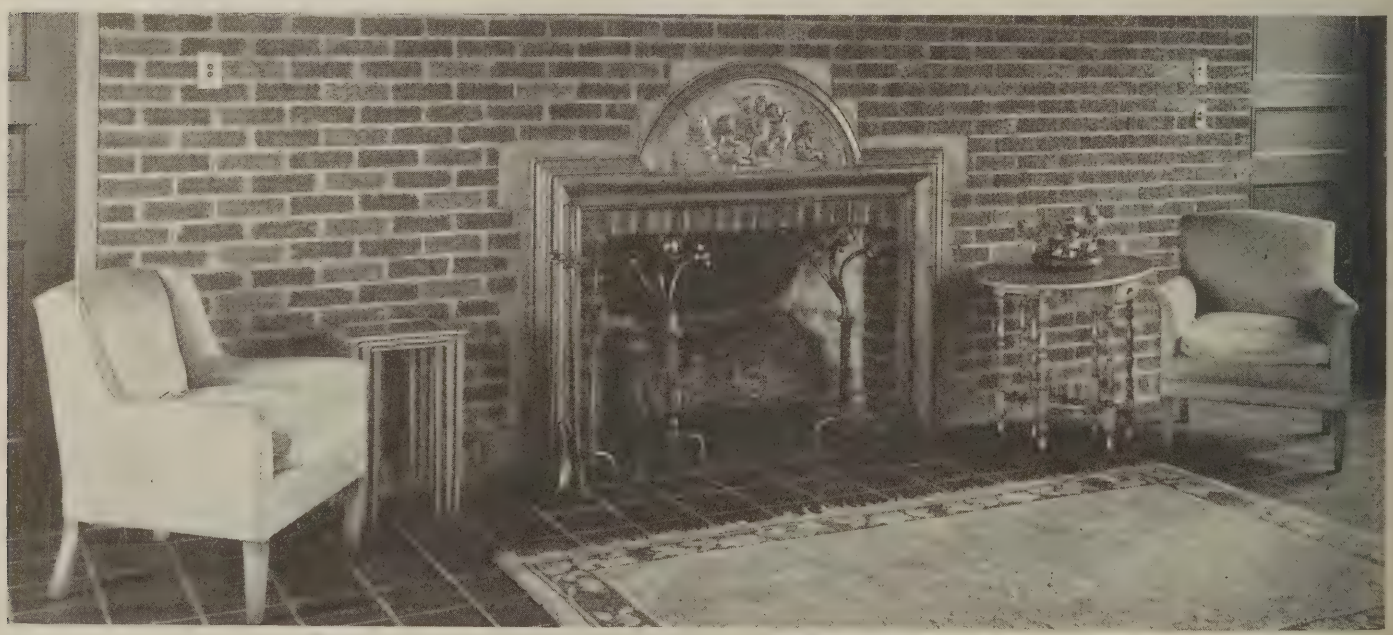
A mantel of standard design, obtainable in oak. Here it is stained a dark brown and used with a facing of marble

other woodwork of the room. Although there are old-time examples of all these types without a wood mantel, they are rarely attractive in modern reproductions, and massed brick, stone, and marble are likely to declare their color too insistently to unite harmoniously with the interior finish of the room unless broken by woodwork. For the same reason, light colored bricks or masonry are better than dark.

Tiles for the Colonial fireplace come in bright glazed colors usually about 6x3 inches or smaller; or in dull red, unglazed in similar oblongs or squares. The latter are especially suitable for the living room and the former for bedrooms. Such tiles are ordered by the set or by the square foot from mantel manufacturers.

The size of the fireplace opening is naturally determined to a large extent by the kind of fuel to be used. Obviously, wood, coal, gas, coke, and logs require different sized spaces for burning. The most pleasing proportions for a mantel are with few exceptions however, with the width greater than the height. From 2 feet 6 inches high by 4 feet 6 inches wide to 3 feet 6 inches high by 6 feet 6 inches wide are considered desirable.

The Italian type house is perhaps the only one in which an art stone mantel is a better selection than a mantel of wood. There is a good selection of both in the ready-made product. For the wood, plain oak, birch or gumwood, and poplar are most easily obtained, and cover all ordinary requirements. They are furnished either "in the white" or with two or three coats of priming, the finishing to be done on the job. For the Colonial home with its painted or enameled woodwork, birch is an excellent choice, because of its suitability to these finishes or



Elegant simplicity characterizes this handsome fireplace for the sun porch. It is of stone, without a shelf, and the overmantel decoration is of plaster composition. The whole is beautifully adapted to its surroundings

to mahoganizing. In Spanish and English type houses, of course, heavy oak is best, sometimes being only a heavy beam, topping the massive masonry of the hearth.

In general, the chief thing to be borne in mind about mantel design is to avoid at all costs cumbersome woodwork, cheap decoration, extrinsic brackets and pedestals. The most successful one is unobtrusive, blending in with its surroundings, as in the old houses. One which does not include an overmantel panel or mirror, or supplementary shelf and columns is much to be preferred.

The fireplace fittings contribute much to the effect of the finished hearth, although actually part of the room furnishing. They can be ordered from the mantel manufacturers in many instances. "Mounted" grates

The plain mantel shelf is favored in many types of houses. It is inexpensive, and the only faults of design to be avoided are too great thickness, and the use of numerous or heavy brackets below it. No brackets are needed, as this example shows

(the style that is all together in one piece) are stationary and must be put in place by the builder, but the unmounted, or portable, type seems to be more popular now. Fire sets, coal and wood holders, andirons, fenders, firebacks, screens and summer fronts are included among the fireplace fittings, and come in oxidized copper or brass, or wrought iron.

The construction of the chimney and fireplace is a subject by itself—and a rather complicated one—as most builders know from experience. Even skilled masons frequently fall into errors in building them which seriously detract from the efficiency of the fireplace and increase the expense of heating, even sometimes endangering life and property. Such importance has been attached to proper fireplace construction that the government has issued a bulletin on the subject (No. 1230) which contains information of value to every builder. There are clear diagrams for smokeless, efficient fireplaces. The relation of the area of the flue and of the throat to that of the fireplace opening have been worked out and are given in simple terms which may be applied to any job. Such questions as the best shape of the chimney, the proper materials, its size and height; the best location for the fireplace, the proper depth and shape of the fireplace opening, and devices for improving its heating efficiency, are all covered in a helpful way.

The illustrations show some mantels that are well chosen, both from old homes and from modern, in which the simplicity and classic proportions of the original models have been reproduced with charming effects.

How the Consumer Wastes Millions of Feet of Lumber Annually

AT a recent meeting of the Practical Size Investigating Committee, which was appointed by the Consulting Committee on Lumber Standards, co-operating with the Department of Commerce, the secretary, T. F. Laist, who is architectural adviser of the National Lumber Manufacturers Association, reported some startling facts.

The waste due to the insistence of the public on buying lumber sawed to only even lengths resulted in a total waste of approximately 140,000,000 feet of sawed timber annually. This represents the average annual growth of over 2,000,000 acres, equal approximately to one-half of the area of the state of New Jersey. This figure may be compared with the original Eastern forest region of 68,000,000 acres, but of which only 60.7 million acres now remain, and with the Western forest region of 140.8 million acres of which there remain 77.4 million acres.

Three hundred and ten examples of house plans were analyzed to show that the consumer actually, although he demands even lengths, saws into odd lengths over 50 per cent of joists purchased. The plans upon which this deduction is based are divided into five groups. Those which may be classed as (1) better class homes designed by architects, (2) ready-cut houses, (3) builders' designs, (4) plan books and builders' plan service and (5) high-grade architects' plans It was found that the waste due to this cause was not confined to the architects but that the builders are equally negligible in getting the most out of their timbers. Thus in the first group 57.3 per cent of the joists were odd lengths, in the second 55 per cent, in the third 61 per cent, in the fourth 55 per cent and in the fifth 50 per cent, making an average of 54.5 per cent in all the examples examined. The percentages which could be saved had the builder been able to purchase the joists in odd lengths would have been as follows: 4.3, 4.4, 5.1 and 3.6. The variation in these percentages is due to the fact that in the most expensive homes the longer length joists are used so the percentage of saving in the long joists is smaller, the maximum saving in each joist never being more than one foot.

In studs the waste due to even lengths is also large but not as great as in joists. It was found that in some sections the 9-foot stud was used extensively.

In boards the odd lengths are not as useful with the standard spacing of 16 inches as the even lengths. Thus with 5, 7, 9, 11, 13 and 15 foot boards the waste would be 20, 5, 10, 4, 7 and 3 per cent respectively, while with the even lengths of 4, 6, 8 and 10, 12, 14 and 16 feet the percentage of waste would in each case be less than in the nearest odd lengths. Therefore, there would be little use for odd length boards if joists were always spaced regularly but openings were almost invariaby placed so that a percentage of odd lengths may be used for the same reason. Short lengths may be used to a large extent. The percentage of short lengths used in an average building is variable but generally amounts to from 25 to 30 per cent or more.

In the larger farm structures where studding is placed 2 feet on centers there is no demand for odd lengths.

In view of the above and other facts the committee recommended that manufacturers produce standard studs in lengths of 9 and 11 feet, in addition to the even sizes now produced; that dimension lumber be produced in lengths as follows: 2x6—9 and 11 feet, 2x8—9, 11 and 13 feet, 2x10—13 and 15 feet, in addition to the lengths now on the market.

The practice of using only even lengths which has always prevailed in this country causes not only the waste at the buildings, as above indicated, but also the corresponding waste at the saw mills. The lumber manufacturers saw logs in 16 foot lengths. If a defect appears near the end of the 16 foot piece it is now necessary for him to saw off full 2 feet, while under the new rule, if adopted, in many cases, the loss will only be 1 foot. In a similar way short pieces are produced where these may come from the slabs due to the taper of the log. A large percentage of these short lengths are now burned because no market can be found for short lengths owing to the prejudice of the retailer and the consumer. Investigations carried on by the Forest Products Laboratory some years ago showed that, based on observation in six mills, the waste due to even length manufacture in saw mills and planing mills amounted to 7.29 per cent of the whole. Of this a certain per cent was necessary waste. The unnecessary waste being equal to 1.27 per cent.

The committee that made these recommendations was representative, the members being:

E. S. Hall, chairman, architect.

William A. Babbitt, secretary, National Association of Wood Users.

E. J. Curtis, millwork manufacturer.

John Foley, forester, Pennsylvania Railroad.

Frank Ward, retailer.

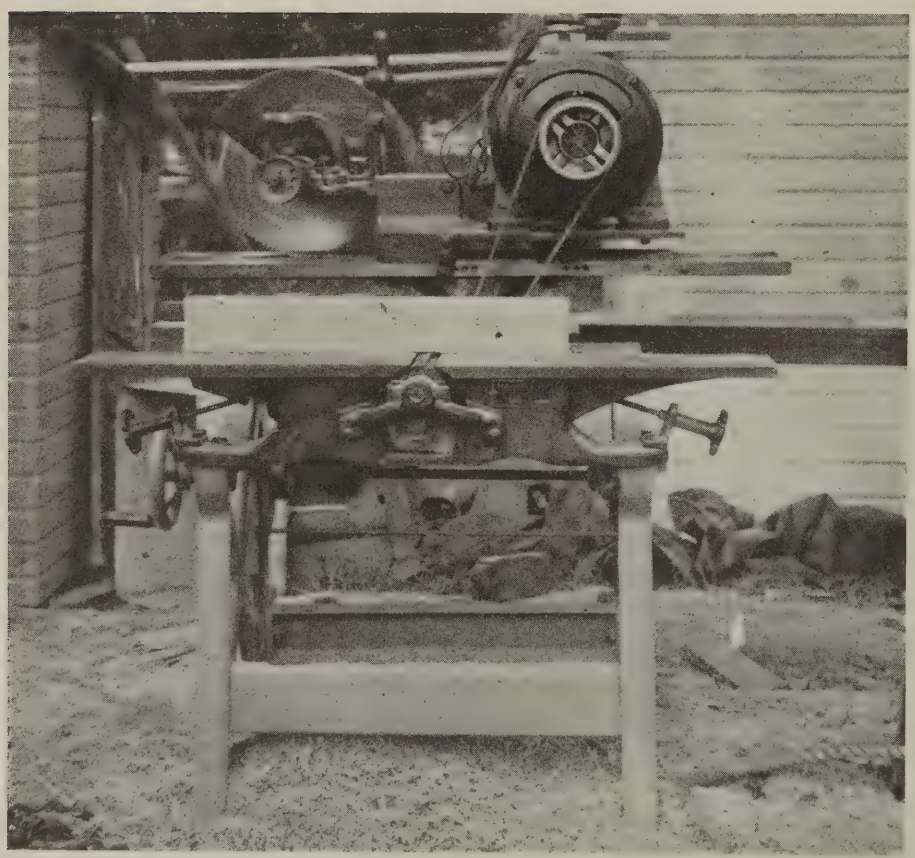
J. E. Jones, chief inspector, Southern Pine Association.

T. F. Laist, secretary.

A general view of the foundation formwork. Notice the two concrete mixers at the left

Mechanical Equipment as an Aid to Job Efficiency

How a Moline, Illinois, Contractor Kept His Working Force at a High Degree of Efficiency by the Installation of Additional Mechanical Equipment

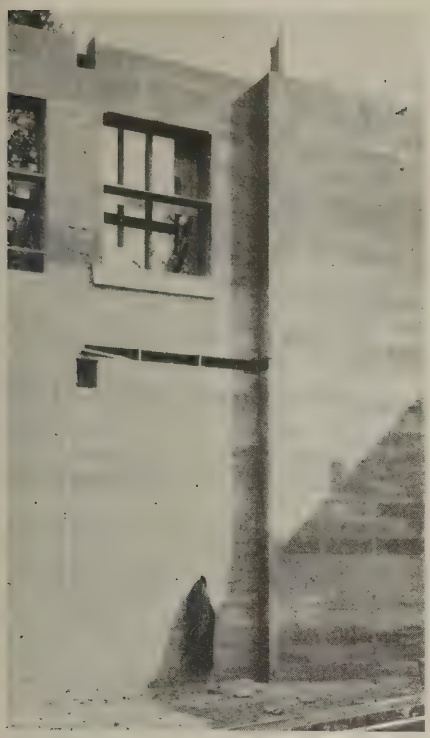


All form lumber was cut on this power saw, thus effecting a considerable saving in carpenter's time

A BUILDING contractor is a manufacturer as well as the man who makes chewing gum or motors. The contractor's output, however, is not standardized. With but few exceptions, each one of his products is different, and different methods of manufacture are usually required for each piece of work he turns out. The contractor, like other manufacturers, is coming to understand the big part that machinery plays in industry, and is beginning to realize the advantage of mechanical assistance.

Among those contractors who believe that many of their problems can be solved by the use of machinery is Harry E. Anderson, of Moline, Illinois. How he used machinery to increase his profits makes an interesting story which may carry a hint for some other contractor who finds himself confronted with a similar problem.

This particular job was a church building about 90 by 30 feet, with a 14-foot deep foundation. Although it could hardly be called a "big job," the foundation had to be placed in a short time in order to get the building under cover before winter weather made bricklaying impossible. An additional difficulty was the fact that hydrated lime was added to the concrete to make the foundation waterproof, and in order to have the lime thoroughly mixed with the cement, the specifications



Detail showing opening in wall for future concrete slab and beam

required that each batch be mixed for at least 2½ minutes.

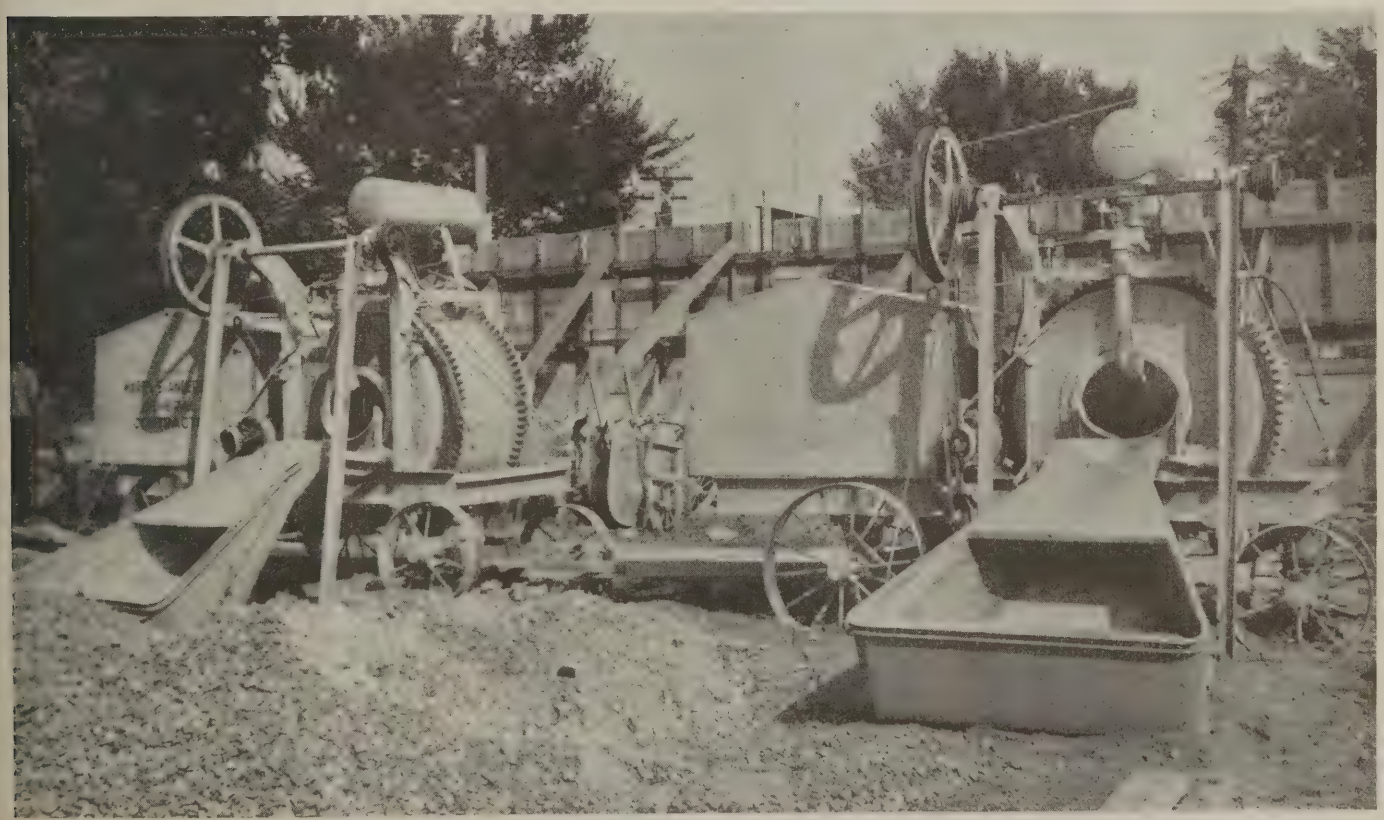
To pour this concrete with only one mixer would mean that while the batch was mixing the laborers used in charging the mixer would have nothing to do for a good part of their time but watch the drum revolve. Also, since the wheeling distance was short, the wheelers would have to wait at the mixer for their loads. This meant a considerable increase in the cost of placing the concrete and as an experiment Mr. Anderson decided to use two mixers.

He installed two one-bag concrete mixers and found that one charging crew could keep both mixers going on account of the long time required to turn out each batch. He found also that he could increase the size of his wheeling gang, and the result of using two mixers instead of one was that his wheeling gang was increased without adding to the number of his charging crew. Thus instead of increasing the cost of placing the concrete, the cost was reduced, since one charging crew kept more than an ordinary wheeling gang busy. Also, since two mixers were operated, the charging crew was kept busy all the time, concrete delivery was practically continuous, and no time was lost by having wheelers waiting.

Not only was money saved in placing the concrete but also in building the forms and placing the steel girders. All form lumber was cut on a power woodworker, thus eliminating expensive hand sawing. This woodworker was operated by an electric motor with power drawn from the city wires.

The heavy steel girders which were used to carry the first floor were lifted into place by means of a chain block operated at the top of a 12-inch gin pole. Only four men were used to set the girders, three men to lift it into place and the fourth to guide it. On the whole, this job is a good example of how mechanical equipment can be used to advantage on an average-size job and it is presented here in the hope that it may awaken other contractors to the advantages afforded by builders' machinery.

Lifting the 3500-pound girder into place with a chain block



The battery of two concrete mixers which helped to increase the profit on the foundation

Combination Grain Elevator and Mill of Reinforced Concrete

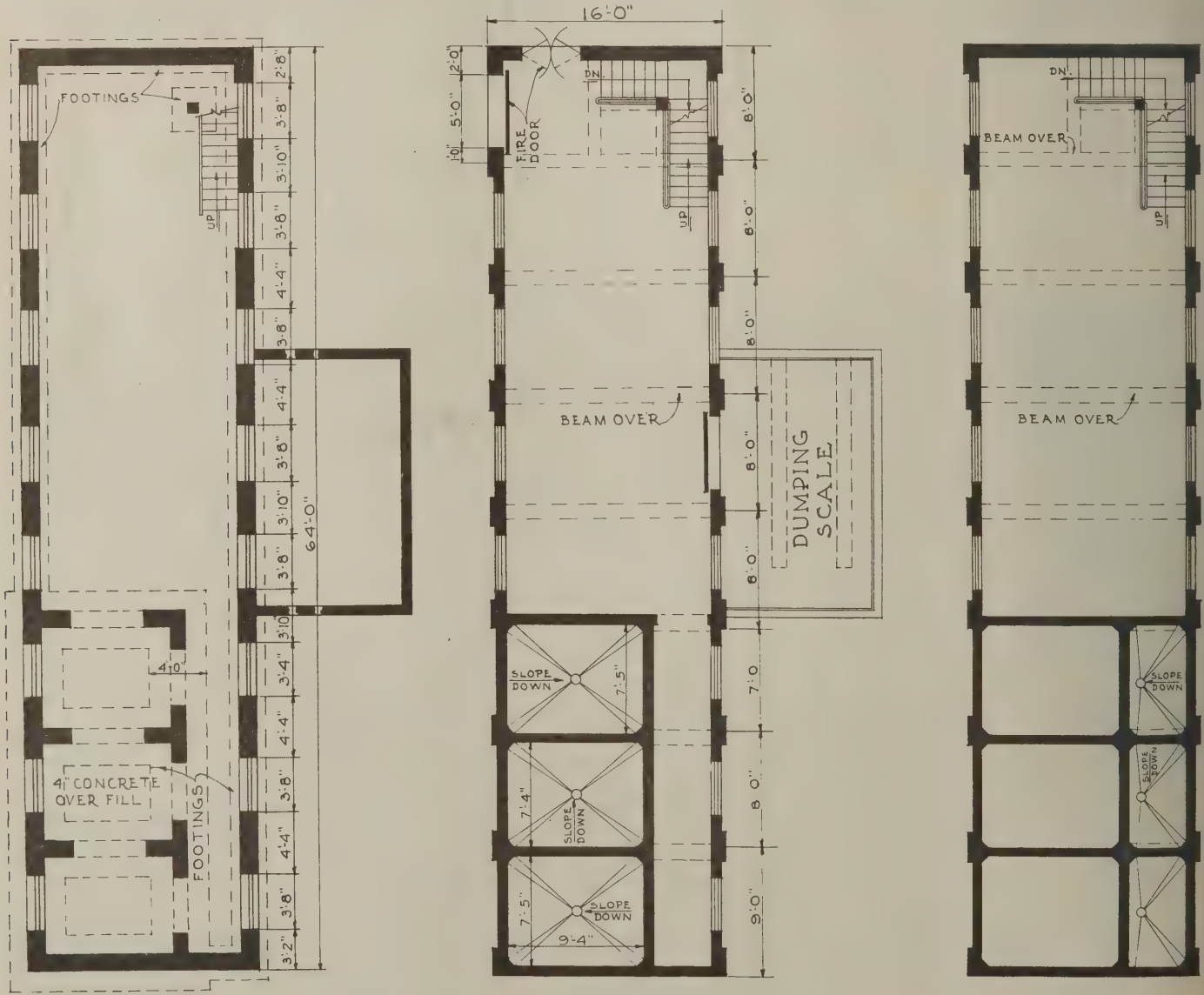
Small Grain Elevator at Eau Claire, Wisconsin, Provides an Interesting Example of Modern Practice in This Type of Structure

THE phrase "grain elevator" usually calls to mind some immense structure of concrete and steel towering high into the air and having a storage capacity of a million bushels or more, but this is not necessarily the case. These enormous sized structures do exist at main terminal points where grain is concentrated for delivery to various large mills, but in the rural communities where large storage capacities are not required the grain elevators are apt to be designed by local contractors and may or may not suit existing conditions. Also, as is generally the case, small elevators must be erected at a fixed cost, and this item more frequently than any other is the deciding factor in the selection of a plan.

Where enough money is available, the design shown here is an example of what can be done in the way of a small reinforced concrete grain elevator. In addition to storage facilities this building also contains a completely equipped mill.

Grain is delivered through a dumping scale and is carried to the storage bins by elevators. From the storage bins it may be either delivered to the milling machine or through a flexible spout to cars on a railway siding adjacent to the building.

This elevator contains three large storage bins and three smaller ones. The large bins run from the first floor to part way above the third, but the smaller bins start from the second floor level above the delivery alley. The milling machinery

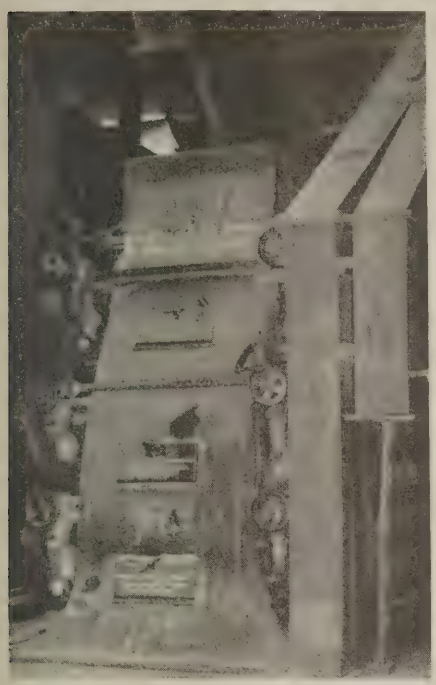


Basement plan *First floor plan* *Second floor plan*

Floor plans showing bin arrangement and principal dimensions

is located on the first floor, and the part of the building above the first floor not devoted to bin space is used as storage room for sacked material.

With the exception of the floors, which are of heavy timber construction, rein-



Milling machine located on first floor

forced concrete is used throughout. Plenty of windows on the several floor levels provide sufficient ventilation to overcome the danger of explosion, a dan-

Delivery side. A canopy runs the entire length of the building, thus allowing grain delivery in rainy weather

ger which presents a considerable risk in grain storage houses.

This elevator was built for the Red Front Store of Eau Claire, Wisconsin, by A. Larson & Company, Eau Claire contractors, and the design is by the Nordyke & Marmon Company of Indianapolis, Indiana. See illustrations on page 64.

Discharge side. Note flexible spout for direct delivery to cars

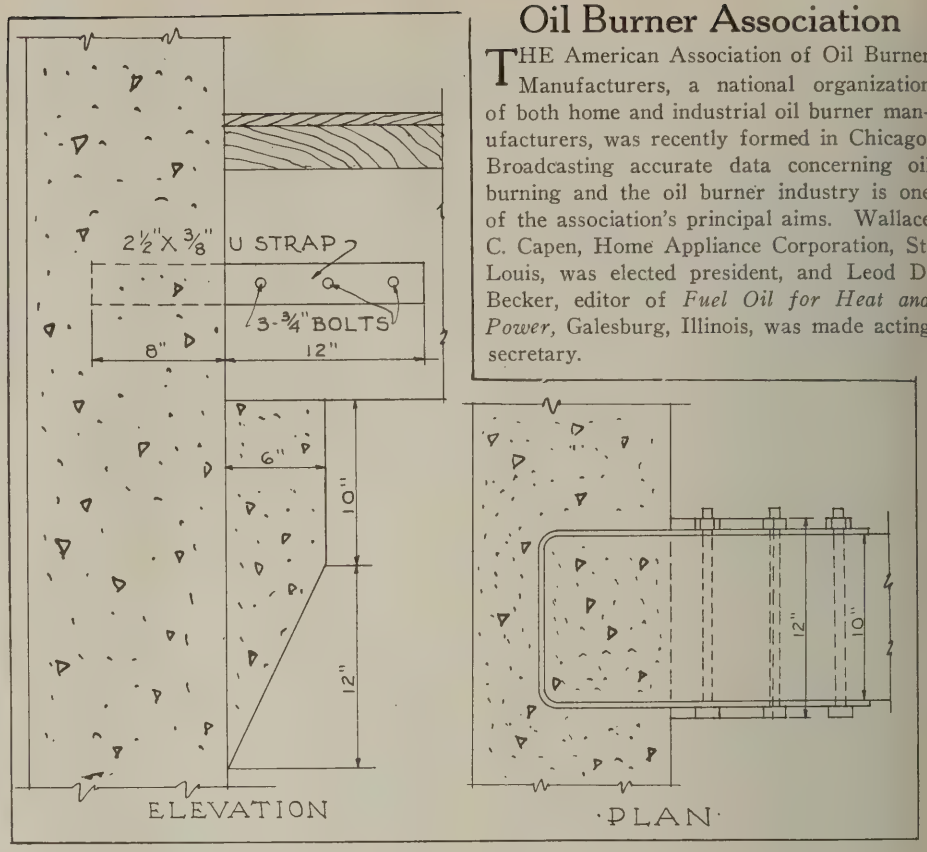
Delivery opening in scale

Standardized Lumber

THE Department of Agriculture will soon have available in circular form definite recommendations for the standardization of grading specifications for yard lumber and for structural timbers. These specifications have already received the approval of a large number of associations and prominent individuals in the lumber industry. The two circulars, now in the hands of the Government Printer, are designated as Department Circulars 295, "Standard Grading Rules and Working Stresses for Structural Timbers," and 296, "Standard Grading Specifications for Yard Lumber."

Distribution of these circulars will probably be made from the Forest Products Laboratory at Madison, Wisconsin. The first editions, consisting of a few thousands each, will be distributed free on request as long as the supply lasts.

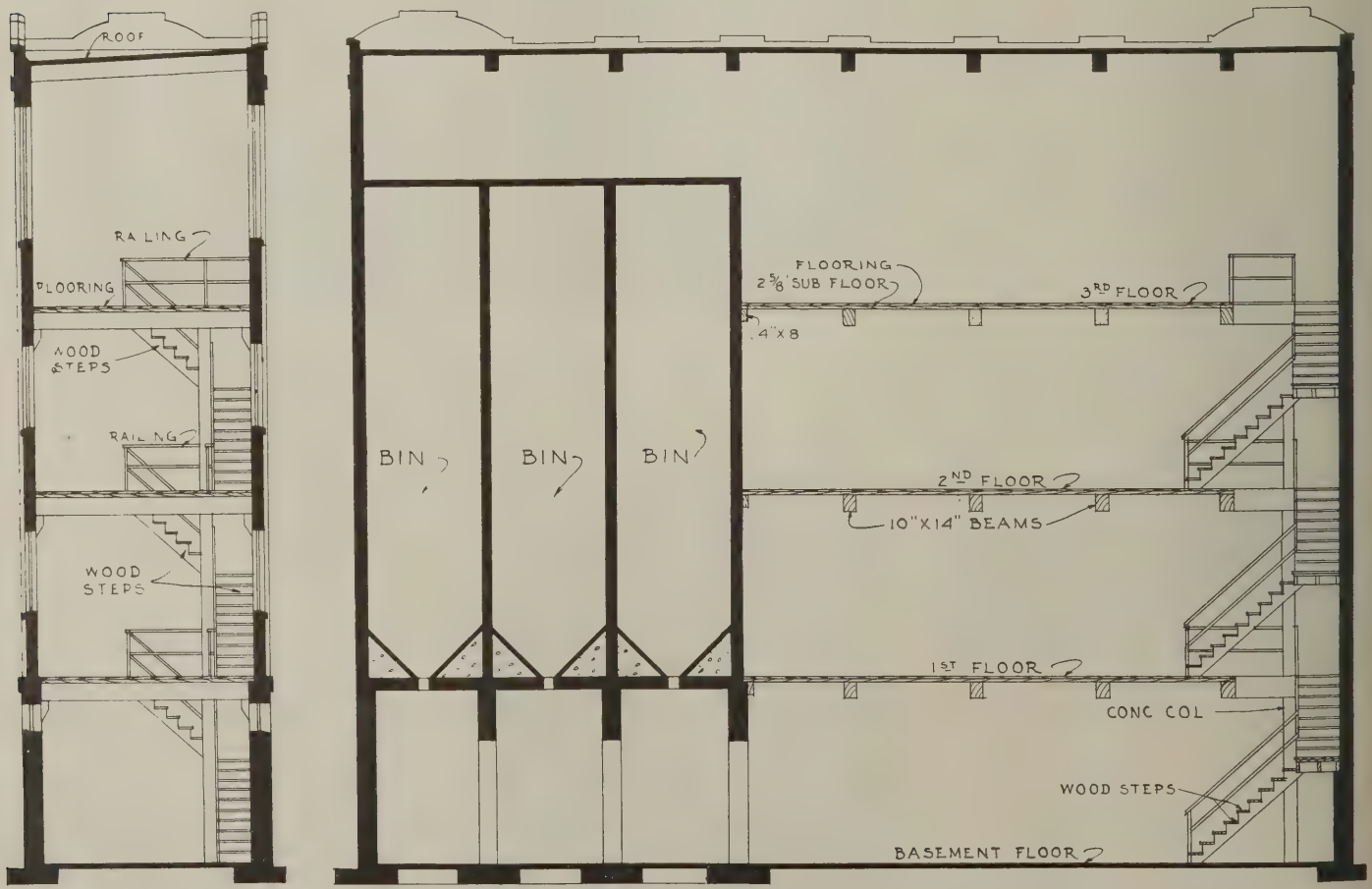
View of delivery alley



Details showing method of holding wood girder to concrete wall. See article on preceding pages

Oil Burner Association

THE American Association of Oil Burner Manufacturers, a national organization of both home and industrial oil burner manufacturers, was recently formed in Chicago. Broadcasting accurate data concerning oil burning and the oil burner industry is one of the association's principal aims. Wallace C. Capen, Home Appliance Corporation, St. Louis, was elected president, and Leod D. Becker, editor of *Fuel Oil for Heat and Power,* Galesburg, Illinois, was made acting secretary.



End and side sections showing bin arrangement and storage space. See article on preceding pages

On the Job in White Plains, N.Y.

An Outrigger Scaffold

FOR certain conditions some contractors use scaffolds of the "outrigger" type. This kind of scaffold is supported by beams of wood or steel projecting out from a building and by its use it is not necessary to build a scaffold up from the ground level.

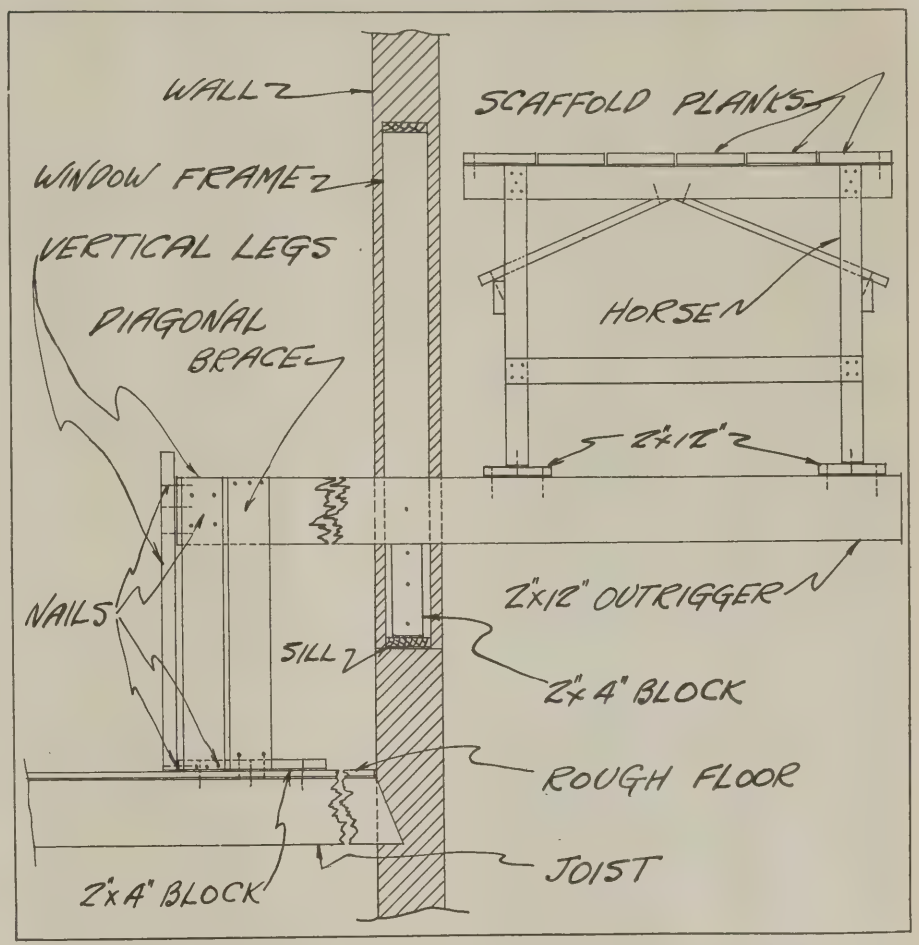
An outrigger scaffold is simple in construction and may be easily erected and dismantled. With the exception of the outriggers and the horses, this type of scaffold requires only short pieces of scrap lumber, such as are found on any job. This means a saving in material costs.

As regards the labor cost: it may be possible that less carpenter time is required to build an outrigged scaffold than a scaffold supported from the ground since in the outrigger scaffold nearly all the lumber to be handled is in short lengths and, for the greater part of the time, the carpenter is working on a solid floor instead of a shaky system of unfinished staging.

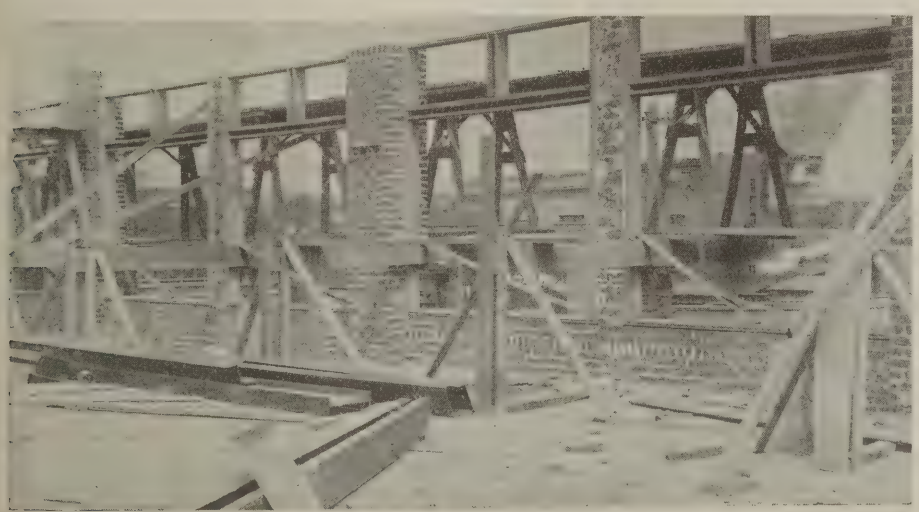
Support for the scaffold shown here is furnished by a 2x12 projecting out from the wall at the window frame. The outrigger bears on a block which is nailed to the frame and one or two heavy nails are used to hold the 2x12 against the frame.

At the end inside the building the outrigger is held by three vertical legs, which are fastened to a 2x4 block nailed fast to the rough floor. In order to lessen the liability of swaying, the outrigger is braced with two diagonal legs, as shown in the photograph and in the sketch.

Notice that the base planks which furnish support for the horses, the horses themselves, and the scaffold planks, are all held together with nails. These nails should be driven only part way so that they can be easily pulled.



Sketch showing assembly of scaffold. The horses and planks which support them are loose-nailed to provide additional safety



View inside the wall showing how outriggers are held and braced inside the building. Details are shown in the sketch above

This kind of scaffold has several noteworthy features which are worthy of recognition. Since it requires no support from below, a good deal of expensive staging, labor and material may be saved by its use. Another advantage of this arrangement is the fact that an outrigger scaffold is entirely independent of scaffolding at any other level. Where scaffolding is carried up from the ground it is necessary to leave all the timber work in place until all work which must be done outside the building is completed. With the type of scaffold shown here, however, the scaffolding at any level may be removed as soon as the work on that part of the building is completed. Thus it is not necessary to block the lower level with an intricate system of wood columns and braces until the entire building is finished.

Max Marx, a New York City contractor, was erecting this building in White Plains, N. Y., where this photograph was taken.

On the Job in Worcester, Mass.

Stuccoed Columns

ARNOLD J. BOOTH, a Worcester, Mass., contractor, builds stuccoed columns in the manner shown in the accompanying sketch.

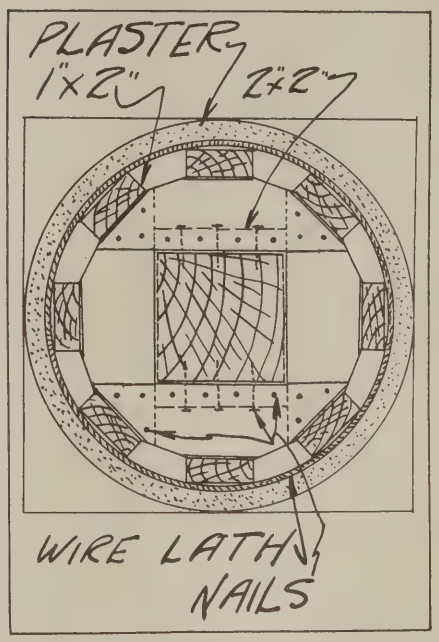
Support for the porch roof is furnished by a 4x4 at the center of the column. At the top, bottom and center of this 4x4 wood post are nailed wood forms cut to furnish a nailing base for the 1x2s on which the

View of column before application of stucco

wire lath is nailed. Midway on the post support, 2x2 blocks furnish a place to which this wood form is fastened. The whole arrangement is assembled as shown in the sketch.

Notice that all the weight the column is called upon to support is carried by the 4x4 at the center. The framework for the stucco carries no load except the stucco itself. This permits of light construction for the shaped frame and also provides a base against which the frame can be securely fastened.

If the wood form is cut as shown in the sketch, the builder is more apt to secure an evenly rounded column than if only a rough approximation of a circle is attempted and the rounding out process left to the man who is applying the stucco. Notice, in the sketch, how naturally the wire lath lays to a true curve. Since the vertical strips



Sketch showing how wood forms for a stucco column are built up about the wood post

are only a short distance apart the wire lath, due to its stiffness, can be depended upon to hold the curve in the spaces between.

Handling Heavy Columns

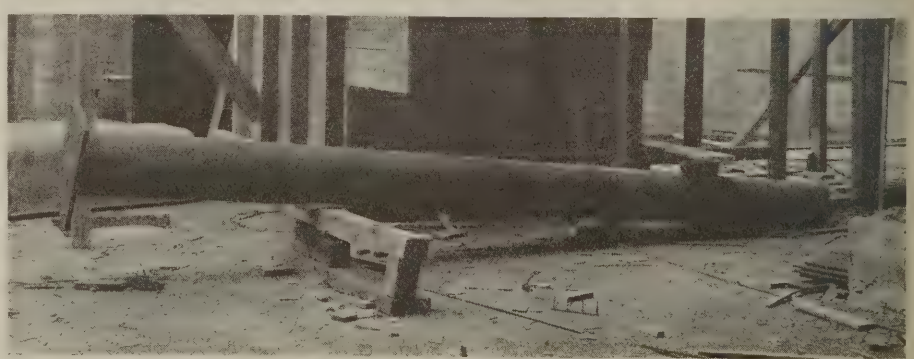
INSTEAD of allowing heavy steel columns to lie flat, Keefe Brothers, of Worcester, Mass., set them down in the manner shown here. Not only is the column easier to handle when it is to be set in place, but also a column set down in this fashion is not liable to suffer a damage to the cap-plate. The chair upon which this column rests is nothing but a few pieces of scrap and it is not even nailed together. Thus the only labor necessary is the couple of moments required to pick up a few blocks.

Scaffolding for a Narrow Street

HERE is how J. J. Robert, a Worcester, Mass., contractor, solved the problem of erecting scaffolding in a narrow street. Instead of building his posts upright from the ground, he slanted them out into the

This scaffolding provides plenty of working room where it is needed, yet does not block the street

street, thus getting sufficient working space where it was needed and at the same time allowing for passage of traffic on the street. This simple idea was the way out of a difficult problem.

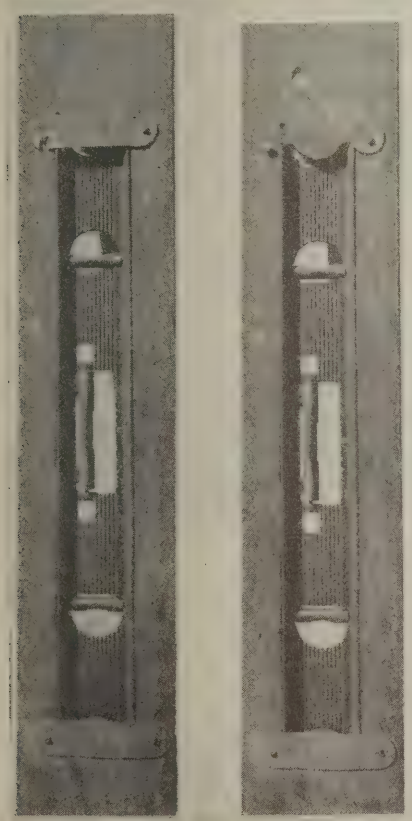


This column can be readily handled without damage to the head plate

On the Job in Moberly, Mo.

A New Plumb Rule

THE device shown here is a plumb-rule which is used for plumbing door-jambs. It was made by R. A. Day, a Moberly, Mo., carpenter. This plumb-rule differs from those ordinarily met with in that it is built to receive a small level. When the rule is not in use the level can be removed and used for other work.



New type of plumb rule showing how level is held to body of rule. The view at the left shows clip fixed to hold the level and at the right is shown the clip fixed to release the level

A study of the illustration showing the section of the rule at which the level is attached will show some interesting features of this instrument.

An opening is cut in the rule at the middle to receive the level and is made the same shape as the outline of the instrument. This opening must be cut exactly true to the outline of the level so that when the level is in place there will be no play. A tight fit is essential to the accuracy of the whole arrangement. Two clips, screwed fast, hold the level at one end, but at the other end only one clip is screwed fast, while the other is fixed so that it can be swung free of the level, as shown in the photograph.

This plumb rule has an advantage over the one ordinarily used since the arrangement of level tubes permit plumbing with either end of the rule on the floor. The ordinary plumb rule is generally built with only two level tubes, one vertical and one horizontal, and if the carpenter takes hold of the wrong end first, he must tip the rule end for end before he can use it.

A Carpenter's Work Bench

MANY carpenters build a temporary work bench of a few planks picked up around a job, use the bench until the job is over, and then throw it on the scrap pile. These rough and ready benches are rarely satisfactory. They do not afford the convenience or the stability afforded by a well-built bench.

The bench shown here was made by E. N. Bell, a builder of Moberly, Mo. It is equipped with two vises and an emery wheel, and contains several tool compartments. A bench of this sort is not hard to build, nor is it expensive. For the contractor who has a place to store it when it is not in use, this bench should prove a good investment because of its convenience and utility.

This bench can be made at some slack time, thus saving the expense necessary to build a rough bench on the job, where the carpenter's time could be put to a more productive purpose.

R. A. Day, carpenter, of Moberly, holding the new type of plumb rule

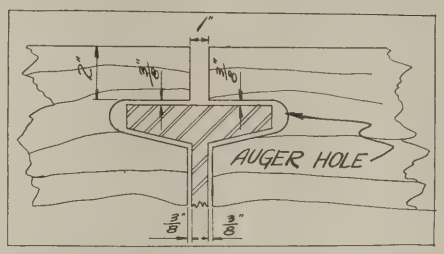
E. N. Bell, Moberly builder, using his carpenter's work bench

On the Job in Youngstown, O.

Framing Wood Joists to Steel Beams

ALTHOUGH this method of framing wood joists to steel beams was taken from a big job it will apply just as well to small work. When the average contractor runs into a job like this he is apt to forget that expansion and contraction of the wood joists, and the settlement of foundations may so affect this kind of framing as to be the cause of a noisy floor and, in many cases, result in a weakening of the entire floor system.

In order to provide a base for nailing the rough floor, the wood joists are cut to lap over the flange of the I-beam. If, on the upper face of the cut, the joist is allowed to rest on the flange, expansion, or more likely, the settling of the building, is liable to cause a crack in the joist as shown in the accompanying sketch.



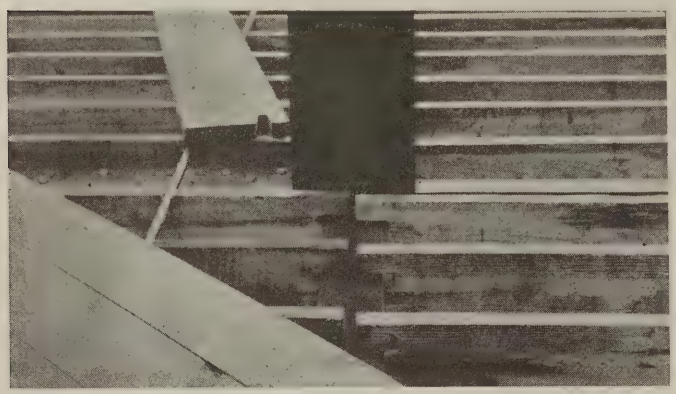
Sketch giving dimensions for clearance cuts

M. C. Kinder, construction superintendent for the Heller-Murray Company, of Youngstown, Ohio, recommends that the job be done as shown here. The joists are cut so that they are given about ⅜-in. clearance above and below the flange, thus allowing for settlement or expansion. If this clearance is allowed the danger of cracked joists should be considerably lessened, and the annoyance of a floor squeak, caused by the upper face of the notched part of the joist working on the iron flange, should be entirely overcome.

Notice that the notch requires only two saw-cuts which meet an auger-hole.

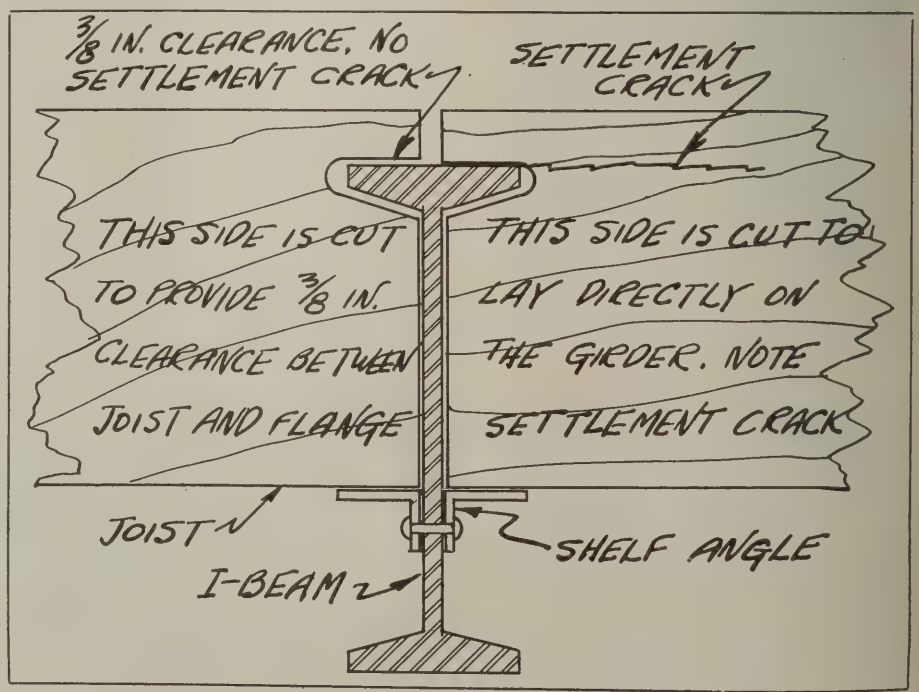
The questions of expansion and contraction and foundation settlement are often neglected by many contractors. They are, however, of considerable importance and a study of their actions will do much to help build better buildings. Exterior evidences of these phenomena are cracks. Wherever a crack appears it may be generally laid to either of these three factors, although other causes do contribute to the formation of these unsightly marks.

If cracking of walls and floors and other parts of buildings resulted only in the defacement of surfaces the subject would not require serious consideration. However, cracks generally go deeper than the surface; they may affect the strength of important members which furnish support for the structure and their occurrence may endanger the lives of the occupants of a building by weakening the building to the point of collapse. This method of framing requires no more expense than the old way since no more than the ordinary number of saw-cuts are necessary.



Top view showing flange notches. Notice the clearances

Side view showing rough flooring strip in place over flange


3/8 IN. CLEARANCE, NO SETTLEMENT CRACK
SETTLEMENT CRACK
THIS SIDE IS CUT TO PROVIDE 3/8 IN. CLEARANCE BETWEEN JOIST AND FLANGE
THIS SIDE IS CUT TO LAY DIRECTLY ON THE GIRDER. NOTE SETTLEMENT CRACK
JOIST
I-BEAM
SHELF ANGLE

Sketch illustrating the difference between two types of framing and showing how and why joists are liable to crack if the upper face of the flange notch is allowed to bear on the flange

On the Job in Huntington, W. Va.

Corner Cut Shingles

WHERE corner-cut shingles are used, the arrangement shown here, used by a Huntington, W. Va., builder, is a simple method of giving them the desired shape. It is nothing but two pieces of scrap lumber with a saw-cut at the desired angle and a nail against which the shingles are butted so that they are all cut at the same distance from the corner. Several shingles can be cut at one time.

Method used to cut shingle corners. The two boards at right angles form a miter box and the nail acts as a stop to hold the shingles at a certain distance from the saw. Several shingles may be cut at the same time

Concrete Arch for Chimney Hearth

IT is customary to build brick arches, as shown in Fig. 1, to support the fireplace hearth, but E. W. Waugh, of Huntington, W. Va., builds them of concrete in the manner shown in Fig. 2 In order to provide sufficient bearing for the concrete slab which forms the hearth base, the foundation brick are corbeled out in the manner shown in Fig. 2 until at least 4 inches of bearing is obtained. The formwork is then built and the slab poured.

Where the slab meets the joist it may be held by a supporting cleat and a few long bolts, fastened into the joist and extending into the slab. The ends which extend into the slab should be bent into a hook shape.

After the concrete sets the forms may be removed, but the arrangement will be more solid if they are left in place, as is done with the centering for brick arch hearths. If the forms are left in place they should be solidly built and wedged tight.

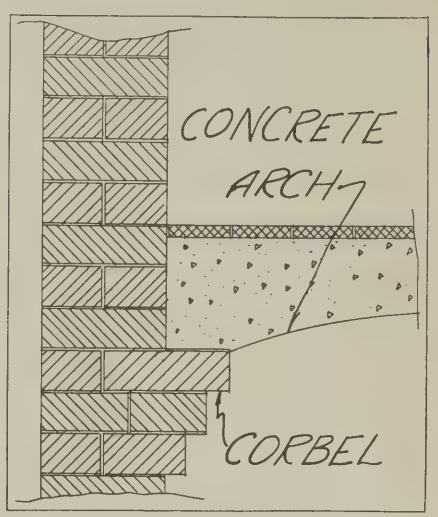


Fig. 2—Sketch showing section through hearth with concrete arch

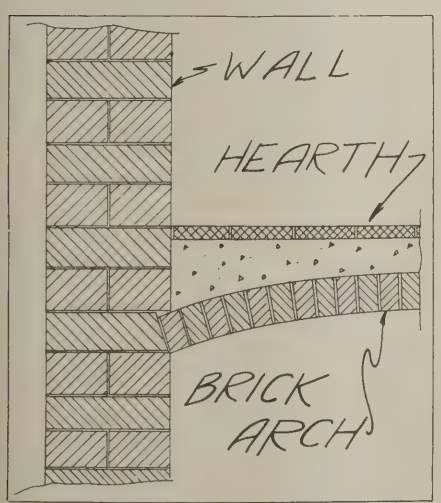


Fig. 1—Sketch showing section through hearth with brick arch

Photograph showing rough walls at hearth. The brick are corbeled to provide a support for the concrete arch which forms the hearth

Suggestions for the Beginner in Architectural Drawing

By V. L. SHERMAN

THE general impression of the architect seems to be of one whose fingers and brains are so properly co-ordinated that he is able to transcribe his beautiful imaginations; that such an occupation involves appearances more than structure, and that usually his field is limited; or that his work is distinct from that of the engineer or contractor. For the beginner possessing such aesthetical views, or for those whose ideals outrun their capacity, there is this story: In a certain Sunday school the teacher elaborated on the wonder of the Easter lily springing from the earthy bulb in the moldly soil, and at his question the entire class answered: "God does it." But one little fellow thoughtfully added: "Fertilizer helps."

No architectural draftsman can confine his study to drawing. His case is hopeless unless he roots into at least part of the technical side and a great deal of the construction side. If as a draftsman he proves timid at inspection of work being done, or is unwilling to quarrel with an unruly builder on points of construction, he had better reduce his work to copying. But the beginner in the art of designing buildings may safely promote his instincts for the sublime if he will provide the soil for them to grow in and welcome contact with others of his line.

Fig. 1—A garden gate at Lenox, Massachusetts

Possibly there is some apology due in harping so much on the building side for the student in architecture at the expense of definite information on how to make drawings, but the writer wishes to make one more contrast. In the engineering industry the work is largely technical, and the growth in the industry has been so forced within the last twenty-five years than every one is on his toes to meet competition for a contract, or an order, or even for his chances for promotion. This rapid growth would have been impossible without the constant interchange of ideas through associations and trade magazines. The whole industry has changed for the better. Within recent years the building industry has been experiencing the same thing. But how about improvement? How about the man who steps in with capital and practically no knowledge of building and by the paint on the house undersells the honest builder to a buyer as unversed as himself? The finished house can not always show the earmarks of future failure as a poor piece of engineering can.

The need is for a better educated public. And the architects and builders will have to see to it. Illustrations from the board, sketches, photographs, anything can be used. But it must be approached from the building side. You have got to prove to the purchaser with the seeds that you can provide better soil and fertilizer than your speculative neighbor. To do this acquaint yourself with the construction by using every resource, building codes, underwriters' rules and suggestions, advice from government bureaus, and so on. But most can be gleaned from trade papers and advertising mediums. It should be borne in mind by all beginners that the better houses in all industries are making every effort to improve the industry. You will find it so especially in building. What these firms spend for technical knowledge in regard to the production and use of their line is surprising, and most of that information is gladly passed along. Never shy at advertising. Whether it is spoken, typed, or printed, take it in and sift it afterwards. Most of the colleges in engineering have an indexed and bound library of engineering catalogs which are given free and kept up to date by the manufacturers who have spent enough money on their literature to provide this means of use among the students, and to eliminate the constant call for more when the catalogs are sent singly. We venture an opinion that the contents of these catalogs provide more and better text than all of the books published. Do not simply take the trade papers, but use them.

One of the greatest of virtues in an architectural draftsman is adaptability. And one of the chief reasons for failure is the lack of it. In the NATIONAL BUILDER for November was shown a *"Film Temple" in Egyptian Style* which was built in Los Angeles. That film temple was adapted to California, and to all appearances California lost none of the Egyptian in the adoption. Mr. Ford, who wrote the article, lived at one time in Illinois, and later in Washington, and now in California displays the same old sense of the fitness of things. Another example is a proposed memorial, sort of town meeting house, in a northern Wisconsin town. Ordinarily it might have been any sort of an attractive building, but instead the architect's drawing provided a small stone and log building set back against an evergreen covered bluff. It was pure Scandinavian and proved a delight to the whole community. Consider the success of the architect who drew the plans for the school-house in Columbus, Georgia, as shown in the NATIONAL BUILDER for November. In providing for the increased capacity he might have done a good many different things, but he

Fig. 2—Determining roof slant

did the right thing, and did it well, because he could adapt.

Too, this quality will insure against the danger of type. One easily recognizes the work of certain illustrators because each works only in a particular style. In very exceptional cases that style may become a sort of trade mark with the artist and prove a help. But that is the exception. In architecture such constraint is bad. You may happen to like the looks of English cottages, but the beginner had better learn to flirt with the small French house, and the Swiss, and the Spanish, and as many others as he has time for if he doesn't want to be wedded to one ideal in a country where the population and climate is too varied for any one class of building.

The writer wishes to repeat that though the eyes take in most of the information, the study of form in architecture is better encompassed by manual work. Sketching should be used at the start and continued until the draftsman's feeling in perspective is safe enough to be automatic. With the first work in sketching one study should be repeated a number of times. It isn't needless busy work, but it is essential that the smaller parts which invariably form most of a completed drawing should be drawn true and without effort. As an apprentice down in Buffalo, New York, one well-known architect was told to go out to an old mill and sketch it in water colors. Before he was taken off that job he had to finish two dozen sketches of that same mill, but he afterward said that it was worth it. The rules of perspective can be learned from most of the modern texts on architectural drawing. The National Builder for June and July, 1922, contains two short articles on scale perspective which describe the methods for arriving at vanishing points, direction, size, etc., but the writer insists that the only way to learn perspective is to sketch in perspective. If you cannot sketch in perspective all the rules in the world will not prevent glaring errors in scale perspective.

Fig. 1 is the yard gate in a place in Lenox, Massachusetts. The lines are few it must be admitted, but it is easy to see that the architects, Delano and Aldrich, were quite familiar with form as regards garden gates before they designed this one. And it is not likely that they depended on their imagination for the finished draft. The roof, wall, gate and pavement are all in keeping with their surroundings and each other.

In your own neighborhood there are many corners, and unnoticed places that will provide the first objects in sketching. Keep to simple outline, and preserve the correct direction of line. Fig. 2 shows a method of placing a line when the direction is in doubt or of correcting direction when the parts of a sketch will not fit. Use a board to draw on and establish yourself comfortably before beginning. Keep to your subject until your materials give out or the light fades. What I mean is keep at it, not because you have an inspiration but because it's all part of the day's work. Do not attempt any effects. Develop an honest style in sketching and stick to it. You will be surprised how much help that training will offer later when you come to real building design, and in building your imagination.

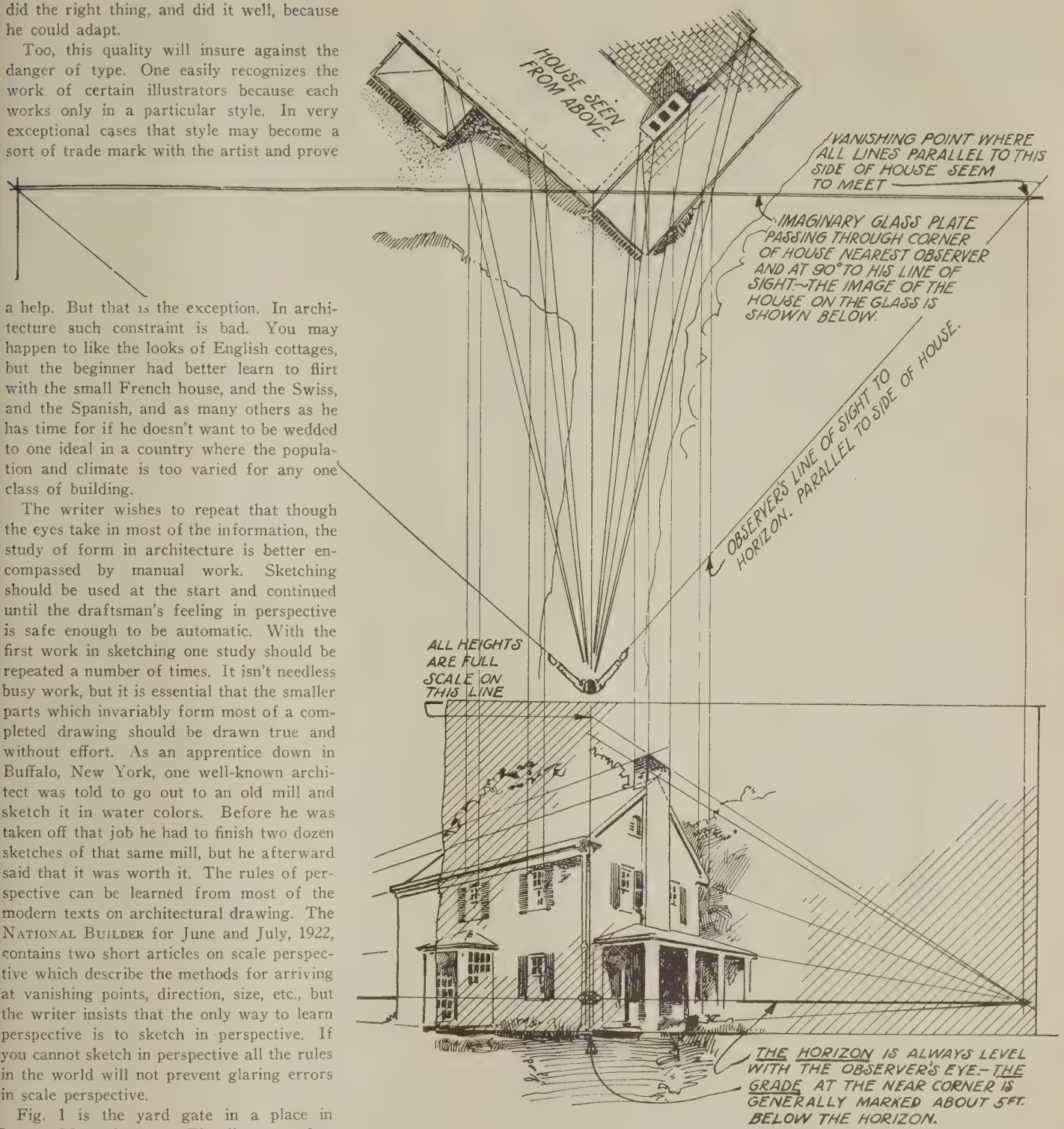

HOUSE SEEN FROM ABOVE.
VANISHING POINT WHERE ALL LINES PARALLEL TO THIS SIDE OF HOUSE SEEM TO MEET
IMAGINARY GLASS PLATE PASSING THROUGH CORNER OF HOUSE NEAREST OBSERVER AND AT 90° TO HIS LINE OF SIGHT—THE IMAGE OF THE HOUSE ON THE GLASS IS SHOWN BELOW.
OBSERVER'S LINE OF SIGHT TO HORIZON. PARALLEL TO SIDE OF HOUSE.
ALL HEIGHTS ARE FULL SCALE ON THIS LINE
THE HORIZON IS ALWAYS LEVEL WITH THE OBSERVER'S EYE.—THE GRADE AT THE NEAR CORNER IS GENERALLY MARKED ABOUT 5 FT. BELOW THE HORIZON.

Fig. 3—Pictorial diagram for perspective

Fig. 3 is employed to show briefly how perspective is accounted for. These diagrams naturally fall under the head of scale perspective, but apply just as well to the ordinary free-hand work. As previously stated, however, the draftsman is more than likely to go on the rocks in developing scale perspectives from plans and elevations unless he is on good terms with his sketching pad. Lines in all perspective work should come from sense of direction.

As a last suggestion we wish to say this about all drafting: MAKE IT PLAIN.

Kinks from the Job and Office

By V. L. SHERMAN

Send in your kinks—give the benefit of your experiences to the other fellow as well as get the benefit of his. NATIONAL BUILDER pays $5.00 for every kink published.—The Editor.

A Drum Trap Cover

H. V. turns in this kink, Fig. 1, and says that he hopes he is not trespassing on the ethics of the profession, but as a plumber it appeals to him. For various reasons drumtraps and their covers are sometimes hard to manage so that the floor is clear above. Changes in flooring are sometimes required while building is under way, and after the plumbing is

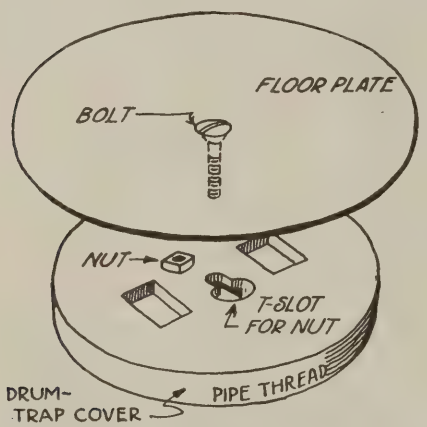


Fig. 1—A drum trap cover with floor plate that can easily be adjusted

worked. Or a slight tip to the trap in placing, and so on. Whoever thought of this made a cover for the trap direct and left a recess into which a nut could be inserted, much as the head of a T-bolt is put into a T-slot. The cover may be any reasonable distance below the level of the finished floor, and, when ready, a flat head screw is cut to the required length, slipped through a slightly counter-sunk hole in a thin floor plate and screwed into the nut in the trap cover.

On Circular Saws

IN the study of physics one of the most amazing phenomena is the gyroscope. Its actions and reactions are in some ways unaccountable. For example, in the earlier part of the war many planes were fitted with a gnome engine, that is, an engine so built that the crank is stationary and the cylinders, five, seven, or so on, revolve about it, carrying the propellor with them. The motor partook of the gyroscope, and, like the gyroscope, tended to yaw to port when its axis was tilted up, and to starboard when pointed down. A buzz saw is a gyroscope, albeit of lesser weight, and a dangerous contrivance to fool with, as this editor can subscribe. Accidents happen so suddenly that they are absolutely painless. Some questions have been asked recently as to cutting grooves with the ordinary circular saw. One writer states that if a board is run askew across the top of a saw a groove

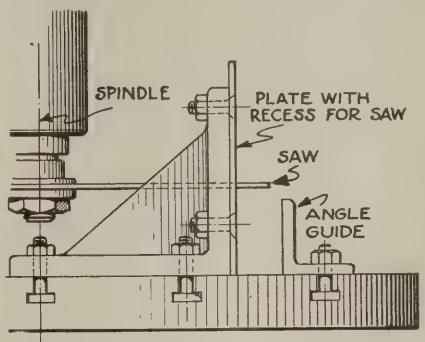


Fig. 2—A circular saw mounted on the spindle of a drill press

can easily be made. While nothing can prevent one from trying it, we will admit this much. Staves can be cut directly across a saw, with the stress parallel to the axis. Special saws for grooving are made by using a helical blade and making a direct offset. Grooving can be done by a saw that is mounted on a wobbly arbor, in which the circular saw never attains its true plane.

While we admit a prejudice against novelties in buzz saw work, we are glad to publish the sketch, Fig. 2, and the letter of G. A. L. "It is possible to mount a circular saw on the spindle of a drill press, provide a simple guide plate and use this to advantage in woodwork. Such a means is used in one small shop wherein only occasional demand for wood sawing facilities are required. For sawing lengthwise this fixture works with equal facility to a saw placed vertically.

"To fit up the drill press for this purpose follow the drawing as regards mounting the saw. The spindle is raised as far as possible in the spindle bearing to provide a rigid support. The bed plate is elevated as far as necessary for use as a guide rest. Two angle plates support a third plate, into which a recess is cut for the saw clearance. The outside guide holds the material in position at the saw. Guide blocks to adjust the thickness of the wood being cut are placed as are required to give the desired thickness."

In this case the speed of the saw is reduced, and fingers can be kept clear. But the saw with one bearing that appeals to us is the saw used to cut piling and that may be kept under water.

Mold for Letters on the Entrance Gate Posts

G. A. L. also writes: "Where the main entrance to the farm is provided with an ornamental gate, an opportunity is provided to make the farm name or owner's name integral with the posts when constructed of concrete, rather than place this on a lettered sign, attached to the posts, as is more frequently done. It is quite simple to have the lettering a composite part of the concrete and the result is an attractive piece of work, indicative of thought and careful beforehand

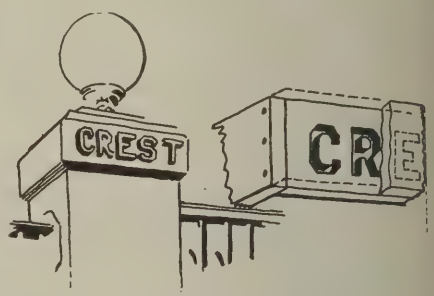


Fig. 3—Lettering gate posts

planning. A carefully molded post neatly lettered rivals a stone post in appearance, particularly where the form is made thoughtfully and the concrete fills into the corners, coming out with clean sharp edges. Block lettering which stands out as though it were chiseled is made part of this mold or form without special facilities or practice, and for this purpose the method as is shown in the attached sketch is available for this work.

"Simply block out the desired lettering as shown in Fig. 3 in the side of the form which will face forward. This side of the form should be in thickness corresponding to the height desired in the letters. An inch high or a board an inch thick will bring out the lettering sufficient to cause a distinct shadow in the light. The panel of the form, after being blocked out, is cut through, leaving the recesses for the concrete, and an outside backing is placed at this position on the back board. The letters are cut with a keyhole or thin fret work saw. The edges are smoothed with sand paper. It will be obvious where the one form is used for both posts, this work is only required to be done once and the posts will be alike. However, where a different lettering is required on the two posts, this is done by changing this panel to correspond."

Decorative work in concrete is not only possible but profitable and pleasing.

A Sure Ellipsograph

C. E. M., of Harrison, Arkansas, isn't satisfied with the string method of making the ellipse, and, perhaps, properly so.

"I notice in a recent issue, in the kinks department, that your correspondents are still discussing the ellipse. I am a millwright and a builder and find occasion to lay out an ellipse very often for sheeting around stacks, exhaust pipes and through pitch roofs. I have discarded all methods for the one I call mine in Fig. 4. It eliminates the chance for error through stretching in the cord. My method is to lay out a rectangle on a sheet, the size of the ellipse, and place the long and short diameters within the rectangle. Then pick up a stick or any piece of scrap strip and measure from the end the

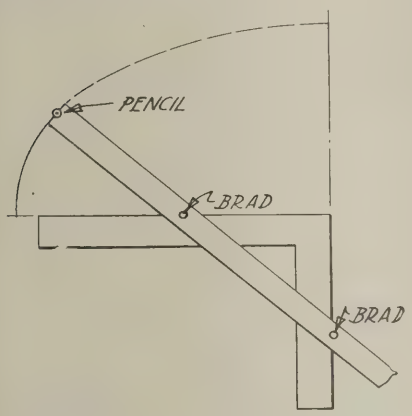


Fig. 4—Method of laying out an ellipse

distance of one-half the major diameter, make a mark, then measure from the same end the minor diameter and mark. Then I drive a small brad through each of these marks, pull them out and put them in from the other side of the strip. Then snip off the points and drive them back so they protrude not quite the thickness of the heel of the square. Then put the square on the sheet, the corner in the center of the cross, then place strip on square so that the heel or angle of the square is between the points of the brads. Hold square firmly to the cross lines, also points of brads firmly against the square, bring the end of the strip as near the square as possible while keeping the brad hooked over the heel, and placing a pencil at the end of the stick move the stick through the first 90 degrees, making one-quarter of the ellipse. Proceed likewise on the other three sections and you have a true ellipse, which will always fit if the square is held to place and the brads against the square."

Hips and Jacks

RECENT letters of inquiry lead us to continue a little this month on the subject of hips, jacks, their lengths and bevels. Answering one letter we regret to say that we "assumed a hatchet would be used in backing off the hip rafter." Personally we are not opposed to the use of a hatchet for the job provided the backer is an artist with the hatchet and knows how

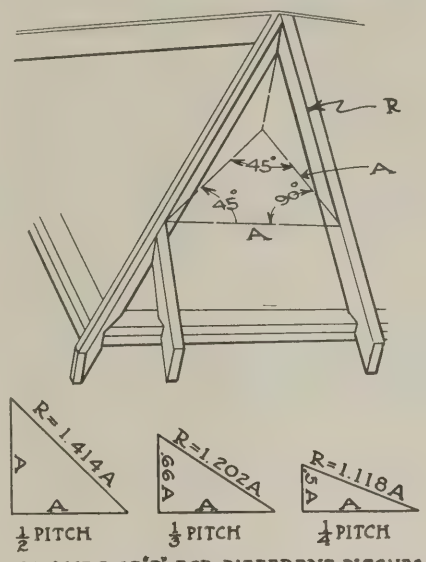


Fig. 5—Showing reduction in each jack rafter down the length of the hip

much backing should be done. So last month we published the backing angle problem again. Another inquiry concerns the amount of reduction in each jack rafter down the length of the hip. We are using the illustration, Fig. 5, as the diagram for that. In many of the little hand books sent out by manufacturers you will find a table for the various reductions in lengths to correspond to the rafter centers and the pitch of the roof. The figures are usually stated in the nearest usable fraction. There is only one small objection to the use of these tables. If you have a large number of jacks with respect to the hip, and you reduce the first rafter to a length that may be a fraction out of the way, and then reduce the second jack from the length of the first, and so on, you will pile up an error that may be bothersome at the lower end.

Allowing for different arrangements of the hip and common rafters at the ridge line, in Fig. 5, an evenly framed hip will always show a base triangle with one 90 and two 45-degree angles. Thus *A*, the center to center distance, will equal *A* the line below the common rafter. The distance *R* along the common rafter is the length of the reduction and is always, in an even hip roof, equal to the base line *A* times the secant of the angle of the pitch as shown. To be exact, start your reductions from the proper length, and then instead of reducing from one jack to the next use the distance from the original rafter and multiply it by the function for that pitch of roof you are working.

Fig. 6 is reproduced from an old-time text on roof framing. The original text was submitted with it. Let *a, b, c, d* be the angles or the corners of the building. To find the length of the hips and their backing, first lay down the plan of the roof, *a, b, c, d,* to a scale of one inch to the foot, as the scale *a, b;* then draw the principal rafters on the plan, *c, b, e,* and dispose of the beams at the proper distances, as room will admit, which beams number 1 and 2, will stand to receive the top of the hips; then draw the base line of the hips *a—c, b—c,* at the square end, and at the bevel end *c—e, d—e,* then take the perpendicular height of the principal rafters, *g, b,* and set it perpendicular, from the base line of the hips, *a—c, b—c,* and *c—e, d—e,* as *c, f,* and *e, f;* then draw the lines *af, bf,* and *cf, df;* these lines will be the length of each hip respectively; then to find the backing of the hips, draw a line square with the base line of the hips, as

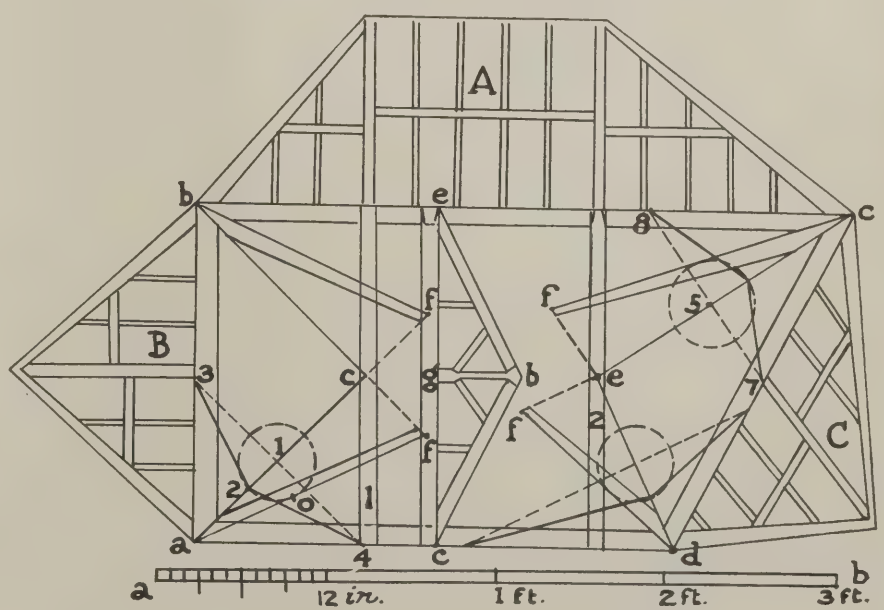


Fig. 6—From an old-time test on roof framing

3, 1, 4, and *7, 5, 8;* then set the compasses at *1* and extend them to touch the hip at *0,* and draw the small dotted circle, as there described; then from the point *2,* where that circle cuts the base line, draw these lines, *2—3, 2—4,* which are the backing of the hips; proceed in the same manner at *b, c* and *d,* as will appear plain to every practitioner, on inspection."

Making Dowel Pins

THIS reader has taken advantage of the inner and outer diameters of pipes. In the old days pipes were a great deal thicker in the wall than now, and since the reduction of the wall thickness permitted by improved manufacture could not effect outside diameters without changing the entire system, we have the imme-

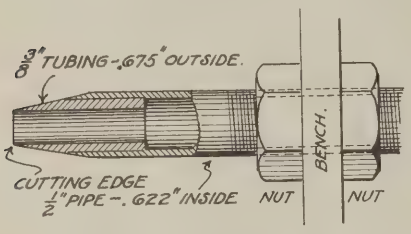


Fig. 7—Tool for making dowel pins

diate case of Fig. 7. A. B. R. writes that some time ago he "had work to do which required a large number of dowel pins. The mills charged so much per foot that I decided to make my own. I had a piece of ⅜-inch steel tubing welded into a piece of ½-inch pipe which had a long thread on it. With this tool fastened to my bench I can make pine dowel pins out of scraps which cost very little."

The Prevention of Pressure from Warped Wooden Forms

H. S., of Emporia, Kansas, who submits the sketch, Fig. 8, and the following letter, is concerned with the swelling of the horizontal forms, or the end thrust against the wall. "To prevent the swelling of the wood forms from pushing out the outside walls of a brick building with reinforced concrete floors, while it is being erected, is an easy matter. The wood forms should always be kept about ¾-inch from the wall, whenever there is a large amount of floor space. This opening should be covered with either rubberoid roofing or tin.

"Many carpenters allow for the swelling of the wood but do not cover the opening to prevent the concrete from filling it up. When this space is not kept open the situation is just as bad as when the forms are placed tight against the walls, inasmuch as the concrete will have set enough so that it will not give, by the time the forms have absorbed enough moisture to make the swelling of the wood forms push against the walls. Some mechanics even have the mistaken notion that the pressure of the concrete before

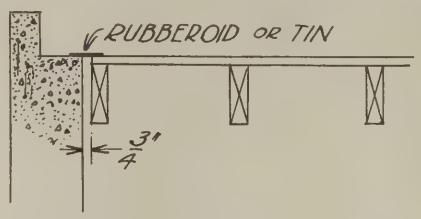


Fig. 8—Rubberoid or tin used to cover the opening between forms and foundation

it has set, causes the wall to go out. The fact of the matter is, of course, that the swelling of the forms forces the walls out."

Are there any in the class who can give definite information as to side thrust occasioned by fresh poured concrete?

Fig. 9 is submitted by M. L., who de-

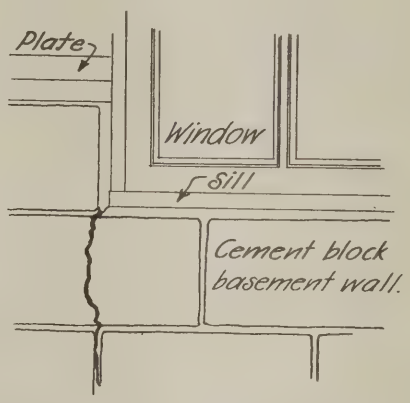


Fig. 9—What caused this foundation wall to crack?

sires to know if he is simply out of luck. "A crack developed in a foundation wall of one of my houses sometime during the summer. The house was built early in the fall of last year. The buyer insists that the crack comes from poor footings, while I insist that the window being left open all summer let an unpainted sill warp. The piece may have been a little too long and I surely think that is the sole cause." What do you think?

Windows in Cedar Lined Closets

AN inquiry from one reader as to the advisability of putting a window in a cedar lined closet leads to this, an extract from a letter by Mr. H. D. Thorn, of the E. L. Bruce Company, cedar lumber manufacturers, of Memphis, Tennessee: "While we have no definite information from anyone having a closet of this kind with an outside window, our suggestion would be to eliminate the window. The value of a cedar closet is maintained only through such care as applies to a cedar chest. That is, the door should be kept closed to keep all of the aromatic qualities of the cedar within the closet walls. That is just the same as keeping the lid closed on a cedar chest. While outside windows are very nice for closets, we believe that in the use of cedar closets where you want every possible protection against moths, the window should not be included in specifications."

A Spreading Jack

FIGURE 10 shows a spreading jack submitted by R. E. J., of Philadelphia. He writes: "This is a kink which I find useful when I want to spread something that

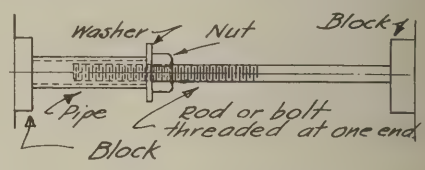


Fig. 10—A spreading jack

does not yield to ordinary methods. A wrench operated on the nut gives a very powerful purchase. The length and size of the material can be varied to suit, and can be found around most any job."

Better Forms

E. C. K., of Jamestown, New York, writes: "I am a carpenter by trade. Form building for concrete cellar walls is of interest to every carpenter in this coun-

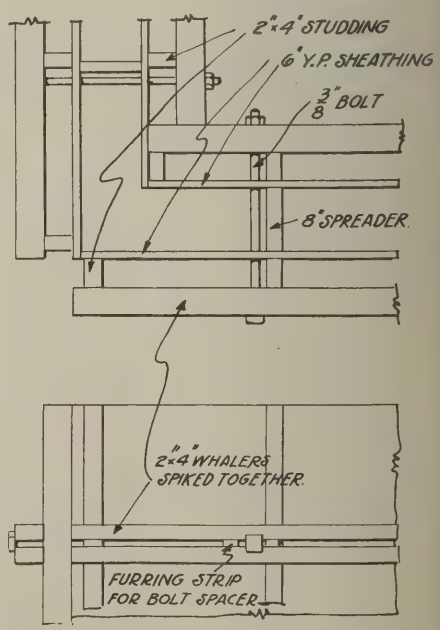


Fig. 11—Forms for concrete cellar walls

try. Using whaling strips and bolting forms together makes a form that will not give way as often times forms do that are wired together." Fig. 11 shows the method used by E. C. K.

How to Make Soft Woods Beautiful as Hardwood

IT is generally admitted that wood finished in its natural shade cannot be worked as successfully into color schemes of decoration as stained wood. It is also true that color brings out the grain and enhances the natural beauty of most woods. For these reasons we manufacture a line of wood colors known as Johnson's Wood Dye.

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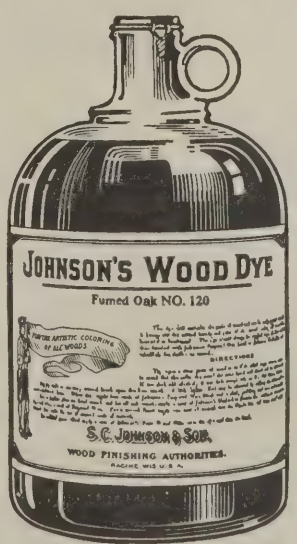

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Of General Interest

The Gilliams Service Photo

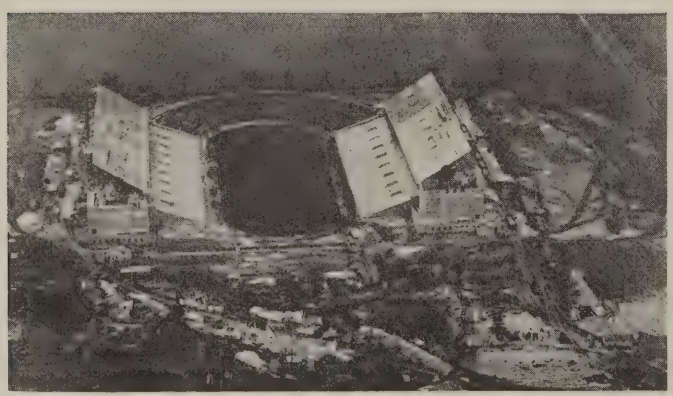
The United States Legation in Norway has just acquired this beautiful new building in Christiania as an embassy. Ambassador Lauritz Swensson negotiated the deal. The new headquarters are on Dammensveien, the largest and finest avenue in Norway's capital

U. & U. Photo

This fourteen-year-old French lad is proud of the new home which he built himself. He and his mother returned after the war to find their old home a pile of ruins and wreckage. His father was killed at Verdun

The entire fortune of Milton S. Hershey, America's chocolate king, amounting to $60,000,000, has been donated as a trust fund to support an orphans' industrial school at Hershey, Pennsylvania, the town he founded. This photo shows the original Hershey factory where Mr. Hershey first started, now part of the school

P. & A. Photo



P. & A. Photo

The new gridiron stadium at the University of Illinois. When completed the stadium will seat approximately 72,000

P. & A. Photo

The great stadium at Columbes which will be the scene of next year's Olympic games. It is at Columbes, Paris

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For the Builders' Library

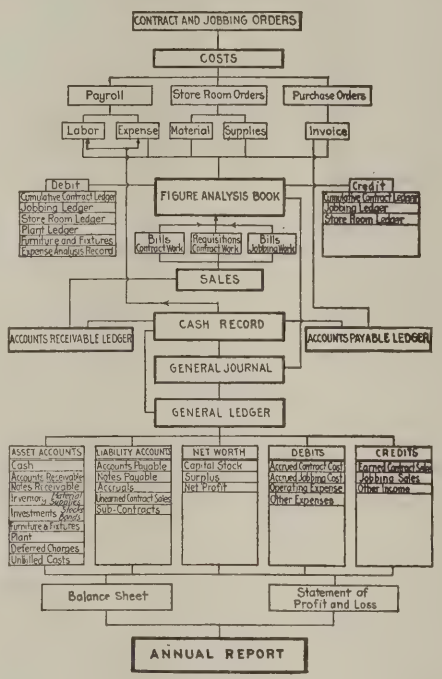
"America's Transition from Old Forests to New," by E. T. Allen. This 27-page booklet, which is 8¾x12 inches in size and bound in paper, is a reprint of a series of articles in the *American Forestry Magazine,* and is published by the Western Forestry and Conservation Association, Portland, Ore. It is distributed free of charge. The subject of forest conservation is one on which people are inclined to "take sides," but the author of these articles tries to present the case without bias of any kind. He discusses America's transition from old forests to new and the forests of the past, present and future in an entertaining and instructive manner, and the text is liberally illustrated with photographic reproductions.

"The Vest Pocket Bookkeeper and Short Cuts in Figures," by F. M. Payne. This is a useful book for the business man who keeps his own books or closely supervises his bookkeeping. It contains instructions for the correct keeping of books of accounts and numerous explanations and forms used in a commercial business, showing an entire set of books based upon actual transactions. How to take off a trial balance sheet and finally close and balance accounts is also explained. The book is 3¼x5¾ inches in size, contains 160 pages, with index, and is bound in brown flexible imitation leather, stamped in gold. Price, $1.00, postpaid. T. J. Carey & Co., 143 W. 96th Street, New York City, publishers.

"Program of Work of Forest Products Laboratory, 1923-1924." The major lines of work on which the Forest Products Laboratory will be engaged during the fiscal year July, 1923, to July, 1924, are described in this volume. All who are concerned with problems of wood utilization are requested to familiarize themselves with this program in order that they may fully avail themselves of the information obtained by the laboratory, make suggestions concerning future work and take advantage of opportunities for co-operative investigations related to the regular program or requiring the laboratory's facilities. The program is sent free upon request. It contains 114 pages and is 8x10¼ inches in size, with paper cover with cloth backbone.

"Practical Accounting for General Contractors," by H. D. Grant. In his preface to this book the author sets forth the purpose it serves and the reason for writing it:

"There are many excellent text books on general accounting and every manufacturing industry of any size and complexity has an accounting literature of its own. But little if anything of a comprehensive nature has been written about a system of accounting to fit the needs of the contractor. This lack is the more noteworthy for two reasons:



General contractors' chart of accounts from "Practical Accounting" for general contractors

First, practically all building and construction work is carried out by estimate and contract and the size and importance of the business are self-evident; secondly, the basis of accuracy in estimating depends upon accurate records and therefore the contractor even more than the manufacturer needs all the help that is to be obtained from a complete system of accounts.

"The need for a comprehensive work on accounting for contractors was brought home to the author some years ago when engaged to take charge of the accounting department of a large contracting concern. The faults of the system of records in use were many and glaring; the remedy had to be devised to fit the needs of the case. After a period of close observation and experiment a system of accounts and accounting control was evolved which fulfilled the essential requirements by giving the contractor the information he required for the management of his business promptly and at a time when he could make use of it. This book in part contains a description of the system to which is added a discussion of the methods and accounting practice that have become the standard practice in those contracting businesses where adequate records are kept."

The subject is treated in three parts: financial accounting, field accounting control and miscellaneous matters—the payroll problems, control of equipment, estimating legal aspects of contracts, etc. An appendix reproduces forms showing different kinds of contractual agreements.

The book is published by McGraw-Hill Book Co., Inc., 370 Seventh Avenue, New York. It contains 254 pages, is 6x9 in size, and is bound in black silk cloth stamped in gold.

"Architectural Composition," by D. Varon.—Those who know, and use, Mr. Varon's "Indication in Architectural Design," will be glad to know that "Architectural Composition" follows the pattern of the earlier volume and makes available a new collection of virile sketches illuminated by a running fire of text that will be a delight and an inspiration to the student of architecture, whether he be young or old. The author's experience as Professor of Architectural Design in Syracuse University and in the University of Illinois endowed him with rare ability to communicate to others the whys and wherefores of architectural design. For instance, he demonstrates that aesthetics enter into floor plans as well as into facades. It is not a "practical" book; there are no plumbing diagrams nor model bungalow plans, but if you want to gain knowledge of the "oldest of the arts," buy it! William Helburn, Inc., New York, publishers, price $6.00.

"The Real Estate Educator," new edition. By F. M. Payne. This little book contains information of especial interest to real estate investors, operators, builders, contractors and agents. The new edition contains the Federal Farm Loan system, instructions on how to appraise property, how to advertise and sell real estate; the Torrens' system, available U. S. lands for homesteads, the "A, B, C's of Realty," how to become a notary public, etc. The book contains 208 pages and is bound in blue cloth. It is 4½x6½ inches in size and is priced at $2.00 postpaid. The publishers are T. J. Carey & Co., 143 West 96th St., New York City.

It is our honest belief that a WINTHROP Tapered Asphalt Shingle roof is beauty developed to the highest point. The big butts are exclusive and distinctive and their soft, delicate colorings add a charm to the home that can be secured in no other way.

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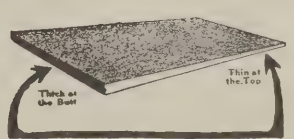
Winthrop Tapered Asphalt Shingles

are more than twice as thick as ordinary asphalt shingles at the butt. They are so stiff and rigid the wind never moves them and they never curl. The beautiful natural colored slate surfacings of tile-red, sea-green and blue-black are permanent because the slate is pressed DEEP into the asphalt coating and does not wash off.

WINTHROP Tapered Asphalt Shingles have the logical shape of the wood shingle—thin at the top, THICK at the butt, where the wear comes. Home owners and home builders bought more WINTHROP Tapers this year than ever before.



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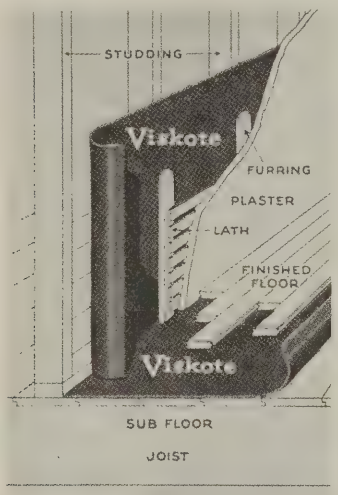
Among the Manufacturers

New Devices Methods and Improvements in the Building Industry

Sanitary Sound Deadening and Insulating Fabric

THE aim of modern sound proofing is directed to the use of materials which are sanitary, damp proof and vermin proof and can be effectively applied. A building, whether a school, hospital, high school,



How "Viskite" sound deadening and insulating fabric is applied

residence or public institution, if exposed to insanitary conditions lacks a vital element in its construction. Sanitation in this class of buildings is recognized as being of great importance and good health should not be menaced by insanitary sound deadening materials.

"Viskote," manufactured by the Richardson Company, Lockland (Cincinnati), Ohio, has been made to provide a suitable sound deadening and insulating fabric which is also sanitary.

Viskote is a loosely woven cushion-like deadening felt, coated on each side with a heavy durable film of "Viskalt Compound," a waterproofing agent, also made by the Richardson Company. A fabric of this kind is said to be a most efficient product for this purpose and this efficiency is increased by the sanitary waterproofing surface. Viskote, it is explained, contains innumerable dead air cells which, in conjunction with the Viskalt coating, reflect and absorb the sound waves. It never deteriorates nor is subject to fatigue; that is, does not crumble or powder from vibrations in the building.

The material is packed in rolls 35 inches wide containing 200 square feet and weighing approximately 75 pounds. It can be furnished from any one of the Richardson factories.

Announce New Catalog

THE A. S. Aloe Company of St. Louis announce a new catalog in which are listed their complete line of engineering instruments, architect's supplies and drawing and tracing papers of both domestic and foreign makes. Buyers of these materials will be especially interested in the comprehensive descriptions accompanying the listing of every article. The book is a very valuable buyer's guide and should be on file in every engineer's, architects's and builder's office. Requests for copies addressed to the A. S. Aloe Company, 513 Olive Street, St. Louis, Missouri, will be complied with by return mail.

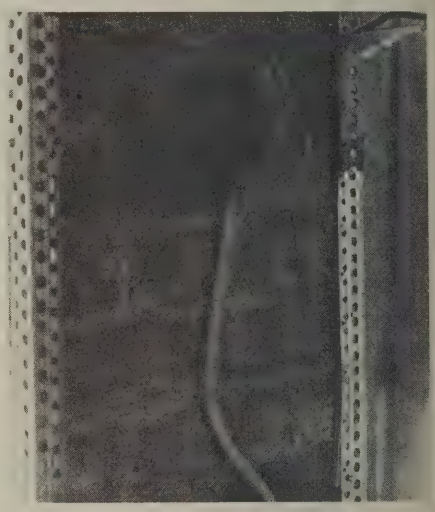
Flexible Flat Armored Cable

THE National Metal Molding Company, of Pittsburgh, Pennsylvania, announces a new armored cable which, when laid on the surface of hollow tile or brick, can be completely covered with an ordinary thickness of plaster. This product is especially

"Ovalflex" applied to the ceiling

convenient in making side-wall bracket installations on the inside of outside walls and in rewiring old buildings. In the latter case it is only necessary to cut a groove about ¾ of an inch wide in the plaster, insert the toggles, which are also made by this company, fasten the Ovalflex to the toggles, and replaster.

Ovalflex is also claimed to be particularly useful in wiring buildings having what are called shallow or solid wall partitions.



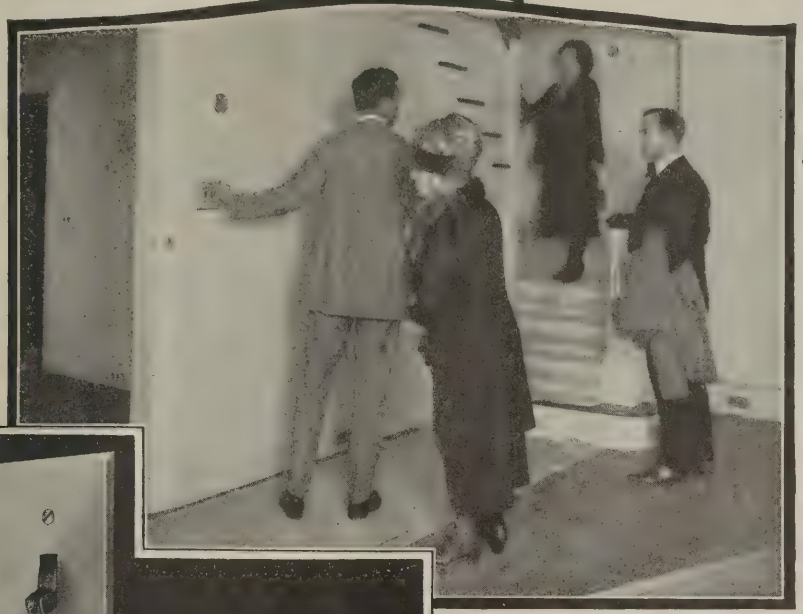
Cable laid on a brick wall

This product has been approved by the National Board of Fire Underwriters and can be used anywhere that the ordinary round armored cable is used. The manufacturers state that its oval shape has a tendency to make it more flexible than round armored cable when bent flatwise and it is just as flexible as the round when bent edgewise. The company manufactures a complete line of fittings to be used with it and claim that as a time and labor saver it is one of the biggest steps forward that has been made in the armored cable field.

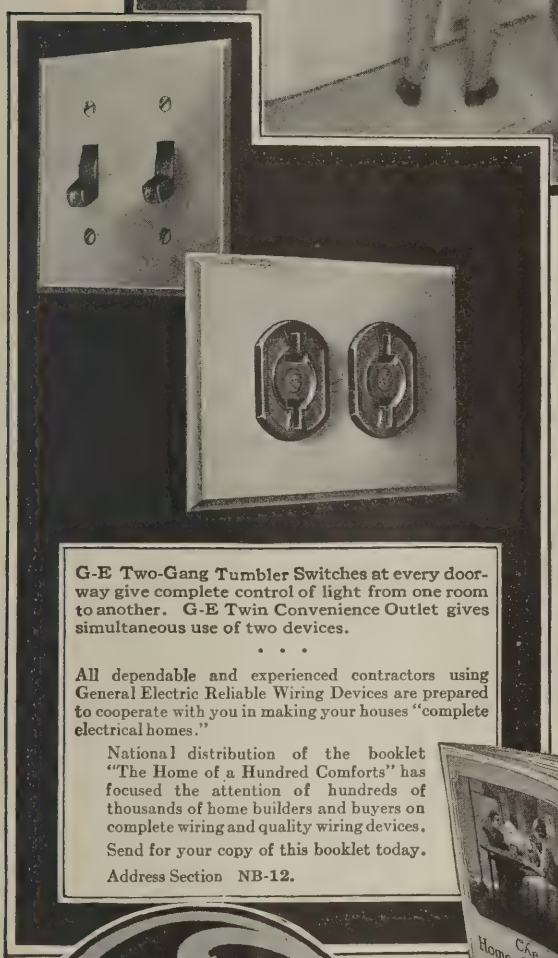
Daylighting Schools

WINDOW ventilation for schools is preferred by the New York Commission on Ventilation as stated in their final report recently reviewed in NATIONAL BUILDER. "Daylighting Schools," published by the Truscon Steel Company, Youngstown, Ohio, digests this report, together with portions of John J. Donovan's "School Architecture, Principles and Practices," and includes with these articles construction details, photographic illustrations and various tables and data concerning Truscon standard steel windows. The booklet is 8½x11 in size, contains 28 pages and is practically a text book on school lighting and ventilating, which will be helpful to the architect and builder who is interested in the designing and construction of school buildings.

When they stop and ask



"How is the stairway lighted?"—you show them how you have provided switches—both downstairs and up—for flooding the steps with light and for turning the lights off as soon as you are up or down.



G-E Two-Gang Tumbler Switches at every doorway give complete control of light from one room to another. G-E Twin Convenience Outlet gives simultaneous use of two devices.

• • •

All dependable and experienced contractors using General Electric Reliable Wiring Devices are prepared to cooperate with you in making your houses "complete electrical homes."

National distribution of the booklet "The Home of a Hundred Comforts" has focused the attention of hundreds of thousands of home builders and buyers on complete wiring and quality wiring devices.

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Builders get better returns by putting in Electrical sales makers

Mrs. Prospective Buyer measures the value of the house largely by saved steps—saved time—saved labor.

She wants to see how much work Electricity will do for her.

And so, while she goes from room to room, the wiring devices—their number—their location—their character—become sales makers for you.

She is delighted with the convenience of G-E Twin Convenience Outlets, G-E Tumbler Switches and G-E Three and Four Way Switches. As she examines these modern devices, one after another, her desire for the house increases.

The knowing builder takes account of her interest in complete and dependable electrical equipment when specifying his materials, and gets a good return for the small additional cost.

G-E Reliable Wiring Devices, nationally known as the standard of excellence, are the home buyer's assurance of dependable electrical service.

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G-E Wiring Devices

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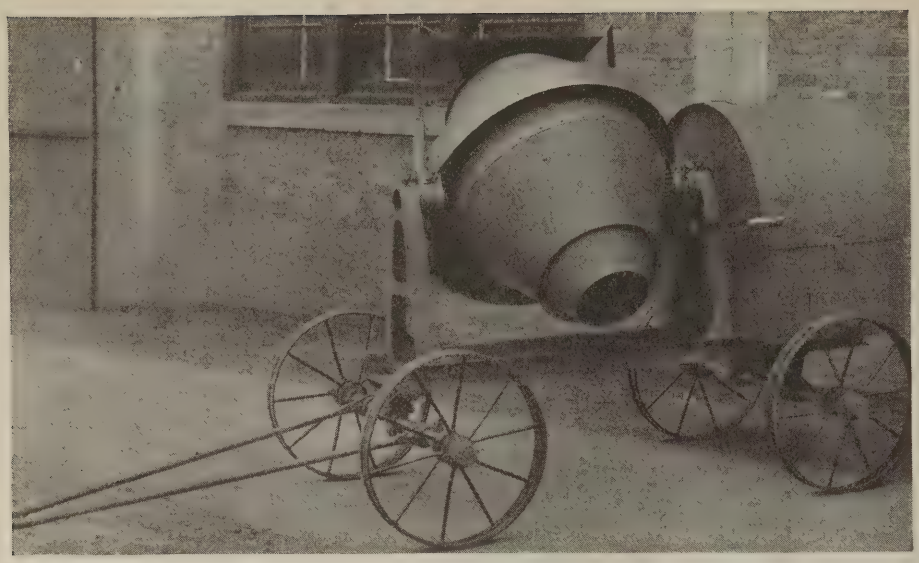


Smith 4-S half-bag tilting mixer

New Machine in Small Mixer Field

A NEW Smith 4-S half-bag tilting mixer is just being placed on the market by the T. L. Smith Company of Milwaukee.

This little half-bag mixer is built along exactly the same lines as the larger Smith tilting mixers, known to contractors for over 20 years. The double-cone drum, the central gear ring and roller track, the independent tilting frame—these are all the same as on the well-known mixers of larger size. The double-cone drum is known for its fast continuous production and speedy discharge. The tilting lever operates easily and locks in the discharge position. The drum returns to the mixing position automatically as soon as the lever is released.

The new mixer has a mixed batch capacity of 3¾ cubic feet or a full half-bag batch of 1:3:6 mix with materials containing the usual 40 per cent voids. It supplements the Smith line of tilting mixers and meets a real demand for a small size mixer of design and merit.

In spite of its small size, it is claimed by the manufacturers, that this mixer is the best made machine in the entire Smith line. The inspection is extremely rigid and the parts are made to very close tolerances. The main drive gear and the engine pinion are machine-cut. The bevel drive pinion is made of 40 per cent carbon electric steel. The chilled thrust rollers have enclosed dust and moisture-proof ball bearings. The bolster castings are of electric steel and the operating levers of malleable iron. The power plant consists of a 1½ horsepower Fuller & Johnson engine, equipped with a magneto. It is completely housed.

The feed chute is made of No. 12 gauge steel plate. The charging platform is built of 1½-inch boards bolted to heavy steel angles. The height of this platform is 30½ inches; width, 32 inches; length, 42 inches.

Smith 4-S half-bag tilting mixers are built in two models. Model RW-1 is equipped with two pressed steel wheels fitted with clincher rims for Ford 30x3½ pneumatic tires. Model SW-1 has four steel wheels, 24 inches in diameter and 3-inch grooved treads. Axles on both models are made of cold rolled steel, 1¾ inches in diameter.

The two-wheeled model RW-1, with its light weight (only 1100 pounds) and pneumatic-tired wheels, is the last word in portability. With a hauling stub that is so arranged that it can be drawn out for readily attaching the mixer to an automobile, truck or wagon, this little mixer can be towed quickly from one job to another. While the mixer is being moved, the front supporting leg is folded up out of the way.

Catalog of Heat Insulation for All Purposes

A CATALOG without pretense but full of brass-tacks information for builders about heat insulation, has recently been distributed by Samuel Cabot, Inc., 141 Milk St., Boston, Massachusetts, the manufacturers of Cabot's "Quilt." The composition of this material is described at length in pictures and text, and its uses for various insulation purposes described—for roofs, walls of shingles, lath and stucco, clapboards and siding, hollow tile, brick veneer, etc.; also factories, warehouses, portable houses, camps, etc.; ice boxes, fireless cookers, ovens, farm buildings, fruit cellars, scientific reasons for the effectiveness of ventilating pipes, heating ducts, etc. The "Quilt" as an insulation is explained, and many examples of successful installations illustrated. The material is also recommended as a sound deadener in floors and partitions. The catalog is sent free to contractors, architects, builders and dealers.

A New Type Portable Sander

A NEW type of portable electric sander has been placed on the market by Barker & Company, 25 South Clinton Street, Chicago, manufacturers of portable electric machines. This machine is designed to eliminate seventy to ninety per cent of the hand work, also to do work just as larger machines would. It is also adaptable for floors. The manufacturer claims that it will put a fine finish on any kind of wood and remove varnish. Inside the housing there is a very strong universal motor as well as the sanding drum at the bottom, the two being connected by a set of gears running in a special lubricant in a separate housing with ball bearings throughout. The gear and motor

A new type portable sander.

housing are completely dustproof. The machine operates on any 110 or 220-volt circuit.

The drum is 4 inches in diameter, 6 inches long, has a speed of 4000 r.p.m. and upon this 6-inch sandpaper is fastened by a new type eccentric clamp in the drum. The drum sands a 6-inch path at one time, but the machine is devised so that each succeeding cut laps perfectly and, therefore, any width can be sanded.

The special roller base permits the machine to be moved easily over the surface and there is a quick up and down adjustment for depth of cut. A coil spring holds the sand drum away from the work except when a slight pressure is placed on the handles, which is the manner used in operation.

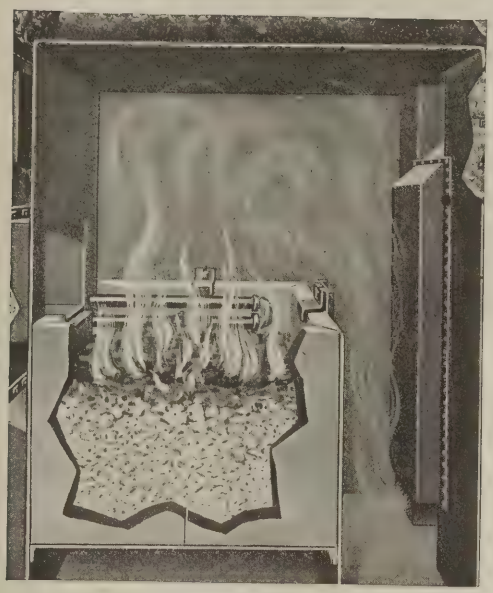
Art Glass Catalog

THE Clinton Glass Company, 21st and Morgan Street, Chicago, has issued a new 32-page catalog of art glass for residences, public buildings and churches. It illustrates and lists various patterns and designs in clear, bevel plate and colored glass set in lead, zinc, copper or brass; also mitred bevel plate. Four pages are in colors. The catalog is 7x10.

Why a HESS!

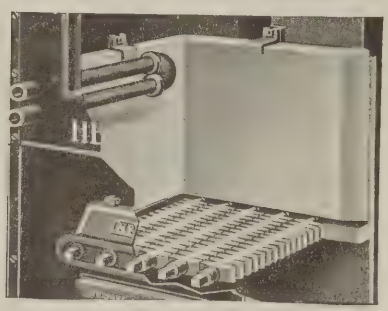
Reason No. 5

Rectangular Fire-Box!



"Every Inch a Furnace"

The illustration at the left shows the efficient, rectangular fire-box enclosed in the leak-proof, riveted and welded steel radiator, and the heat-saving smoke outlet. The illustration below shows the thick, protective fire-brick lining of the fire-box, and the individually operated grate bars which give perfect control of the fire.



Most Efficient Heating With Any Kind of Fuel—Simplified Operation

IN 1898, we discarded round fire-boxes and grates, after using them for 24 years, because the rectangular fire-box, such as is universally used in locomotives and power plants, had been definitely accepted by heating engineers as the most efficient type.

The square fire-box has a larger area to throw off heat, and permits a grate under the entire area so that there are no corners to fill with dead ashes. It permits individually operated grate bars, easy to turn, keeping every part of the fire live and bright. Any portion of the fire can be cleared without disturbing the rest of it. Clinkers rarely form. The fire-box and grates are close to the front, so the fire can be cared for easily and conveniently. The square ash pit is easily cleaned.

HESS *furnaces,* because of their grate arrangement, are adapted to burn any fuel—hard or soft coal, coke, wood, corn cobs, lignite, soft coal slack, gas, or oil. Space is also provided for a smoke settling chamber and special smoke outlet. The square, welded steel, leak-proof radiator makes HESS *furnaces* particularly adapted to oil heaters, as it radiates immediately, and no odor, gas fumes nor smoke can escape into the rooms.

Write for "Modern Furnace Heating," a book that will help you solve your heating problems

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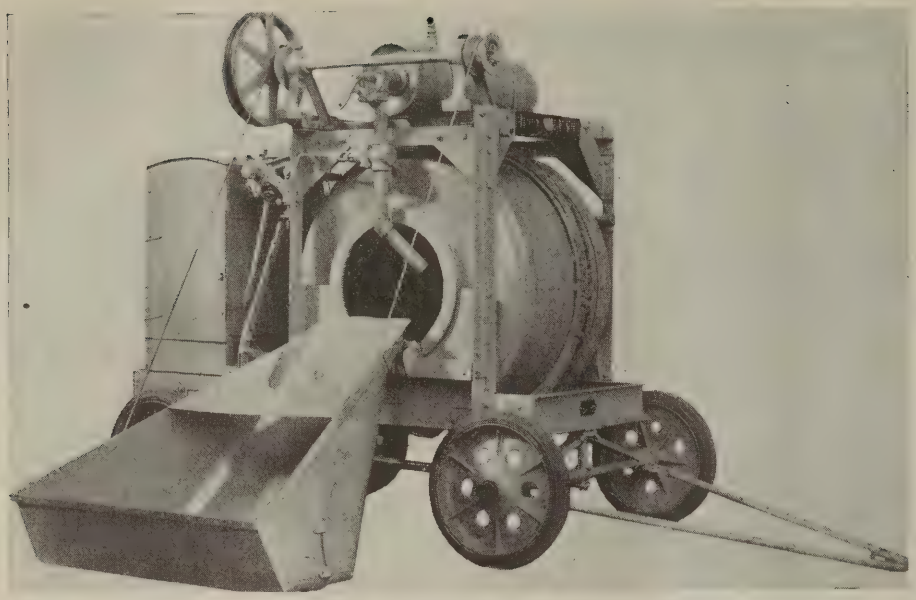
HESS *Welded Steel* FURNACE



One of the new models of Rex mixers

Chain Belt Announces New Models

TWO new models of Rex mixers have been announced by the Chain Belt Company of Milwaukee, a half-bag mixer to be known as the Rex 234-S, and a one-bag machine, the Rex 237-S. Both are the so-called low-charging types and can be equipped with either a hinged platform or charging skip.

During the past three years most of the development work on concrete machinery has been largely confined to pavers and remarkable speed in the handling of material has been the result. The manufacturers call attention to the following features:

In the drum the mixing blades and buckets have been specially arranged to decrease the time required for discharging the batch, no matter what mixing proportions are used. The opposite side discharge control is of an entirely new design to make the operation of the chute easier. The power charging skip has been constructed so as to reduce the time of charging the drum.

By mounting the countershaft up out of the dirt line and using a vertical engine, the new Rex models have been made very compact and sturdy. The shorter wheelbase makes them more readily portable, especially in close quarters. Truck construction is distinctive in design, the front axle being built up of cold-rolled shafting and trussed channels to give it greater rigidity. An adjustable malleable jack placed on the charging end of the axle gives the mixer 4-points suspension while mixing concrete.

The superstructure is built of heavy steel angles which are gusseted in both directions. The main countershaft is mounted on self-aligning bearings high up on the machine, where it is readily accessible at all times. An asbestos disc type of clutch which has a greater gripping area and is smoother in operation has superseded the old wood block type of clutch. Self-oiling bushings are provided in the drum rollers which are of malleable iron construction.

The Rex 237-S is equipped with an 8 horsepower 2-cylinder vertical, hopper-cooled Le Roi engine having a high-tension magneto, an automobile type carburetor and a throttling governor. On the Rex 234-S a 4 horsepower vertical gasoline engine is used.

Either machine can be equipped with a hinged low-charging platform which folds up while traveling, or a power charging skip. Rubber tired disc wheels or built-up steel wheels are optional equipment. The disc wheels are equipped with phosphur-bronze bushings to allow faster traveling over city streets.

"Rug Anchor" Prevents Accidents

"RUG ANCHOR" is the term applied by E. I. duPont de Nemours & Company, Incorporated, Fabrikoid division, Newburgh, New York, to a new product designed to prevent accidents from rugs slipping on smooth floors. It is like the material used on automobile curtains—oil cloth surface on one side and cloth on the other. The oil cloth face is turned down toward the floor on which it will not slide, and the cloth side up receiving the rug. Because the resiliency of the "anchor" absorbs much of the impact on the rugs when they are walked on, and because it smooths over inequalities in the floor that might cause excessive wear, it actually saves rugs, the manufacturers claim. Samples for demonstration purposes are sent free of charge.

Stanley Detail Manual

THE Stanley Works, New Britain, Connecticut, have published a portfolio of detail drawings showing application of their products. The book is divided into five different sections, devoted to bronze and steel butts, bolts, blind and shutter hardware, garage hardware and screen and storm sash hardware. The drawings are mostly one-half size and they are supplemented by photographic illustrations of the Stanley products. A copy of this portfolio is supplied upon request to architects, contractors, builders and those interested in specifying and using hardware. It measures 7½x 10⅝ in., is printed in one color and has a loose leaf binder cover.

A Portable Belt Sander and Grinder

A PORTABLE motor-driven belt machine for surfacing, sanding, grinding and polishing all parts in production work has recently been announced by the Porter-Cable

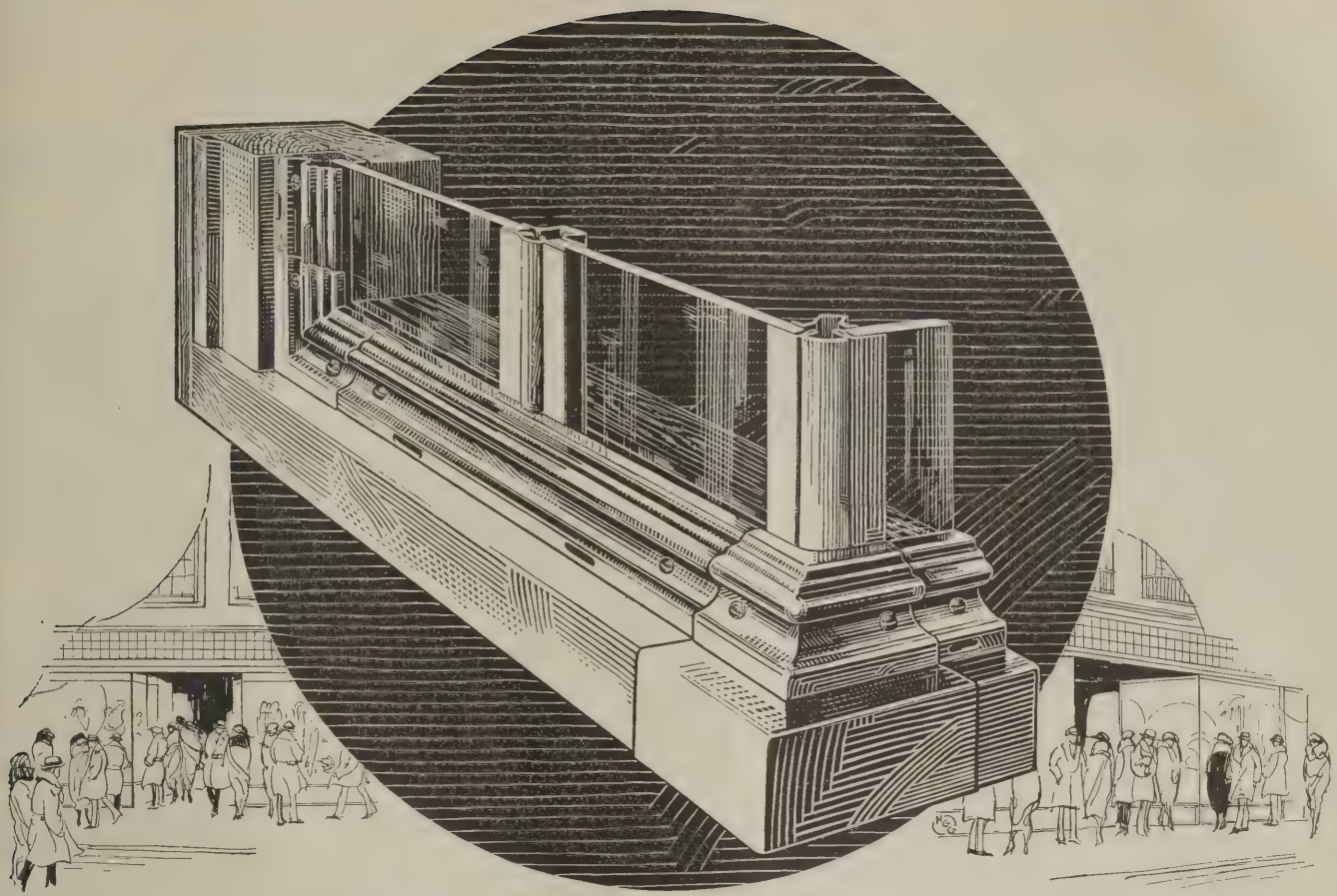
Syracuse motor-driven belt sander B-1

Machine Company of Syracuse, New York.

The manufacturers state that it is compact and built like a machine tool in perfection of design and high class workmanship and is the first machine of its class in the field. It is adjustable for use in a vertical or horizontal position. Metal or wood is easily handled by the use of the proper abrasive belt, which can be changed in less than a minute.

Motors for Alternating Current Circuits

CONTRACTORS and builders using electric motors on alternating current circuits will be interested in bulletin No. 5018, published by the Reliance Electric and Engineering Company, Ivanhoe Road, Cleveland, Ohio. It describes the company's large line of induction motors for two and three-phase A. C. circuits. The design of these motors is fully explained; the stator, stator winding, bearing brackets, bearings, rotor, outlet for conduit connections, interchangeability and the standard equipment are illustrated and described in detail.



Profitable Contracts Readily Secured

When one merchant installs a modern copper store front, his competitor is almost forced to. That is the reason these contracts come easily to contractors prepared to handle them.

"Desco" Metal Store Front Construction makes it possible for ***any*** contractor to figure on these profitable jobs. The simplified construction, which automatically provides for glass expansion and contraction, drainage, ventilation, cushioning of the glass, etc., makes technical knowledge unnecessary. Inexperienced mechanics can handle the work.

Write for the "Desco" book for contractors which tells how ***you*** can enter this big paying field.

DETROIT SHOW CASE CO. 1655 West Fort St. DETROIT, MICH.

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Desco METAL

STORE FRONTS

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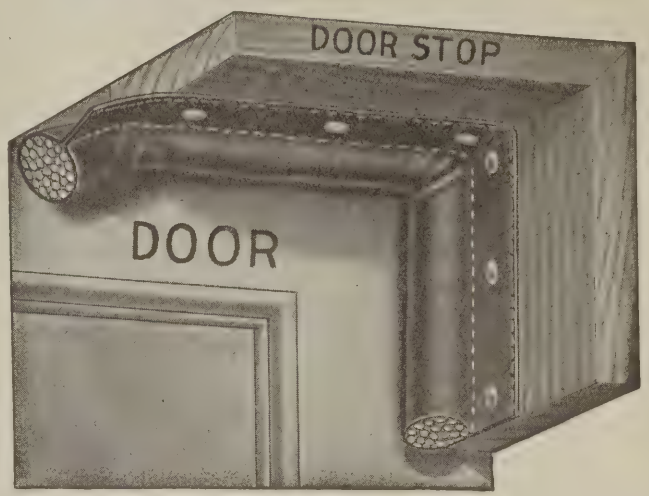

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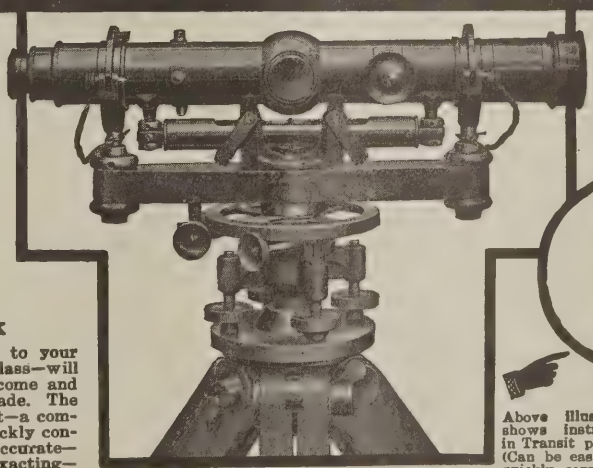

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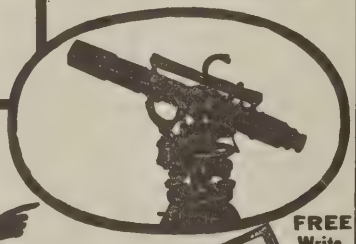

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Bison City Building Corporation, Buffalo, N. Y., Plan No. 906-6. January, 16.

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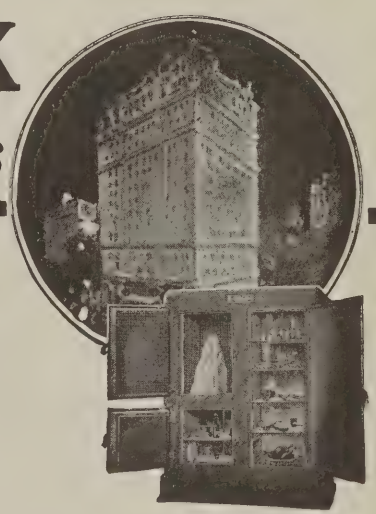

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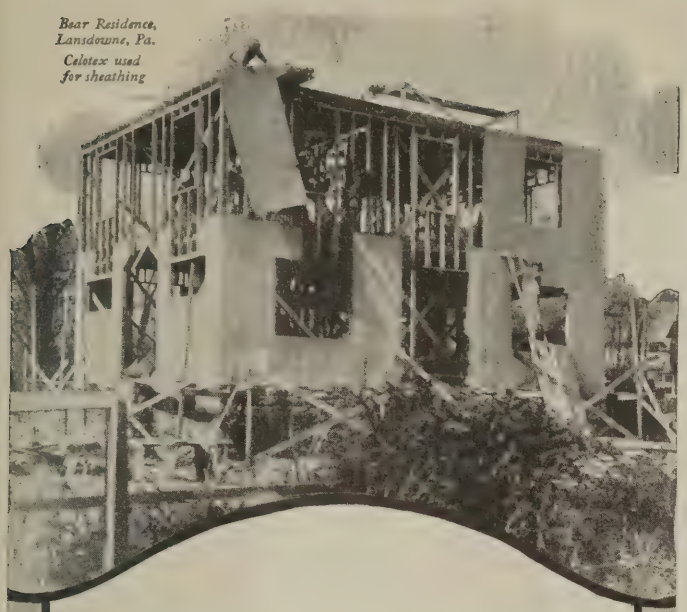

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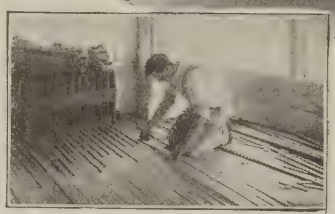

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Statement of the ownership, management, circulation, etc., required by the Act of Congress of August 24, 1912, of NATIONAL BUILDER, published monthly at 542 S. Dearborn St., Chicago, Ill., for October 1, 1923. State of Illinois, County of Cook. ss.

Before me, a Notary Public in and for the state and county aforesaid, personally appeared George P. Miller, who having been duly sworn according to law, deposes and says that he is the Manager of the NATIONAL BUILDER and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 443, Postal Laws and Regulations, printed on the reverse of this form, to wit:

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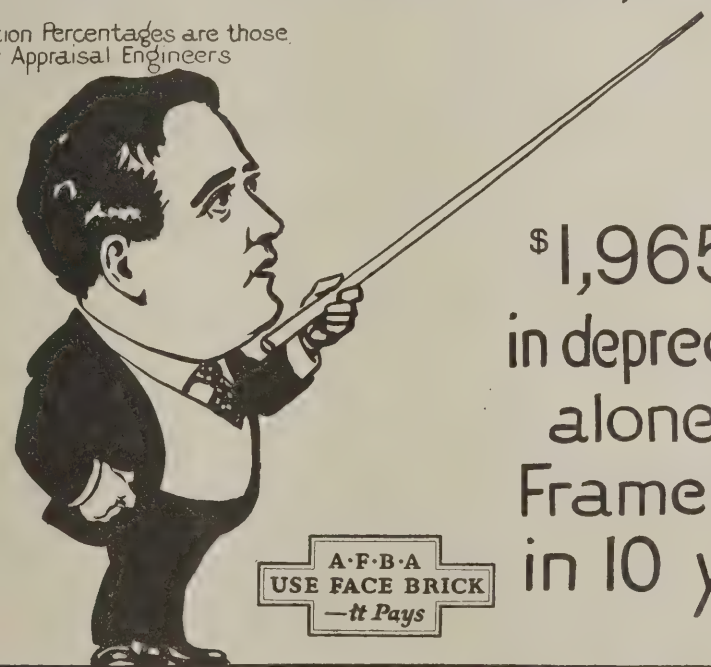

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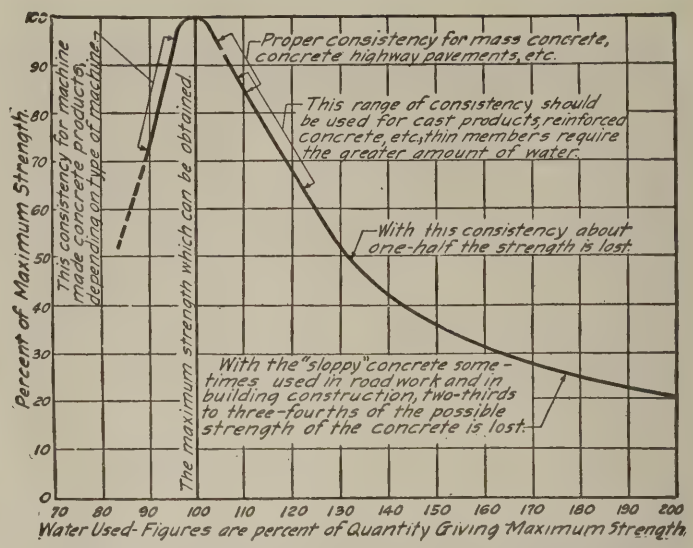

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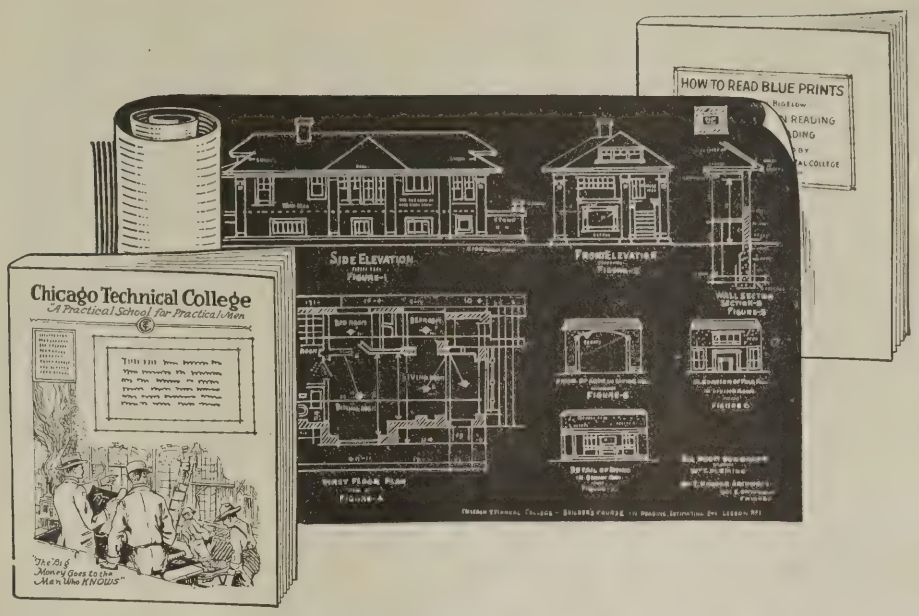
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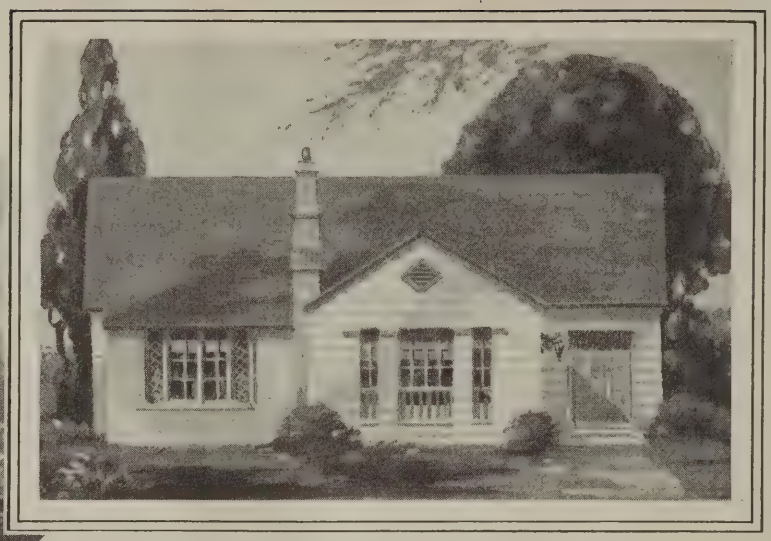

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5—Surfaced (planed smooth) four sides.
6—Unusual care in trimming.
7—Full length—uniform in width and thickness.
8—Uniformity of grading.
9—Uniform seasoning.
10—Lower grades receive the same care and attention as upper grades.
11—Correctly piled and stored—carefully shipped.
12—Minimum of carpenter labor—planing, sawing and sorting—necessary to put into construction.
13—Minimum waste, due to uniform quality.
14—The product of a lumber company 47 years in the business.
15—Long-Bell lumber can be identified by the Long-Bell trade-mark on the end of the piece.

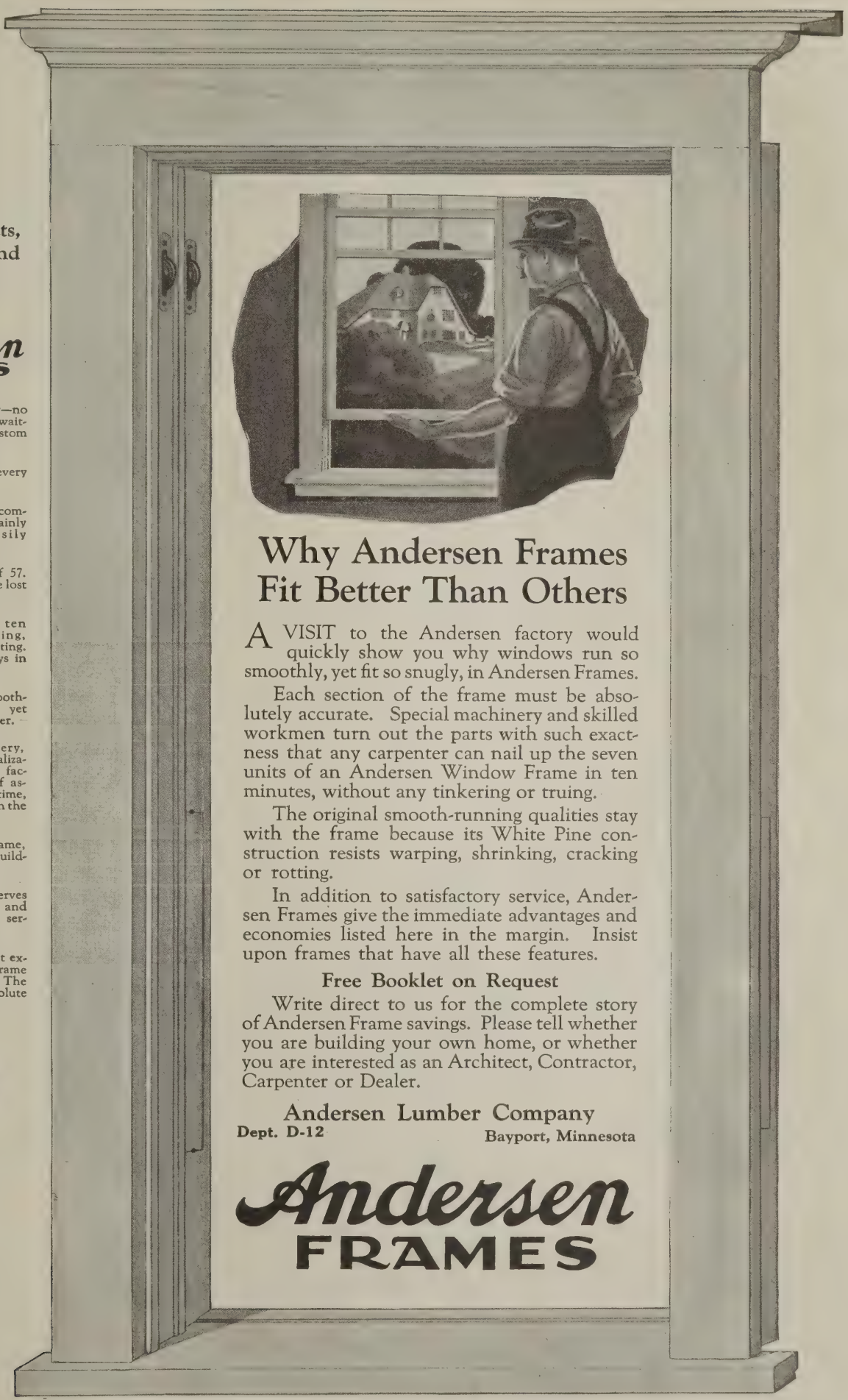
The Long-Bell Lumber Company
R. A. LONG BUILDING Lumbermen since 1875 KANSAS CITY, MO.

LONG-BELL

Why Architects, Contractors and Dealers Recommend

Andersen FRAMES

1. Immediate delivery—no expensive delays waiting for special custom made frames.
2. 121 sizes ready for every purpose.
3. Delivered in two compact bundles plainly marked and easily handled.
4. 7 parts instead of 57. No small parts to be lost or broken.
5. A frame up in ten minutes. No sorting, measuring or refitting. Pockets and pulleys in place.
6. Accuracy gives smooth-running windows, yet excludes all weather.
7. Modern machinery, methods and specialization lowers cost at factory; quickness of assembly saves you time, labor and money on the job.
8. Better results in frame, brick or stucco buildings.
9. White Pine preserves original accuracy and gives continuous service.
10. Made by the largest exclusive standard frame manufacturer. The trade-mark is absolute protection.



Why Andersen Frames Fit Better Than Others

A VISIT to the Andersen factory would quickly show you why windows run so smoothly, yet fit so snugly, in Andersen Frames.

Each section of the frame must be absolutely accurate. Special machinery and skilled workmen turn out the parts with such exactness that any carpenter can nail up the seven units of an Andersen Window Frame in ten minutes, without any tinkering or truing.

The original smooth-running qualities stay with the frame because its White Pine construction resists warping, shrinking, cracking or rotting.

In addition to satisfactory service, Andersen Frames give the immediate advantages and economies listed here in the margin. Insist upon frames that have all these features.

Free Booklet on Request

Write direct to us for the complete story of Andersen Frame savings. Please tell whether you are building your own home, or whether you are interested as an Architect, Contractor, Carpenter or Dealer.

Andersen Lumber Company

Dept. D-12 **Bayport, Minnesota**

Andersen FRAMES

JAEGER
CONCRETE MIXER

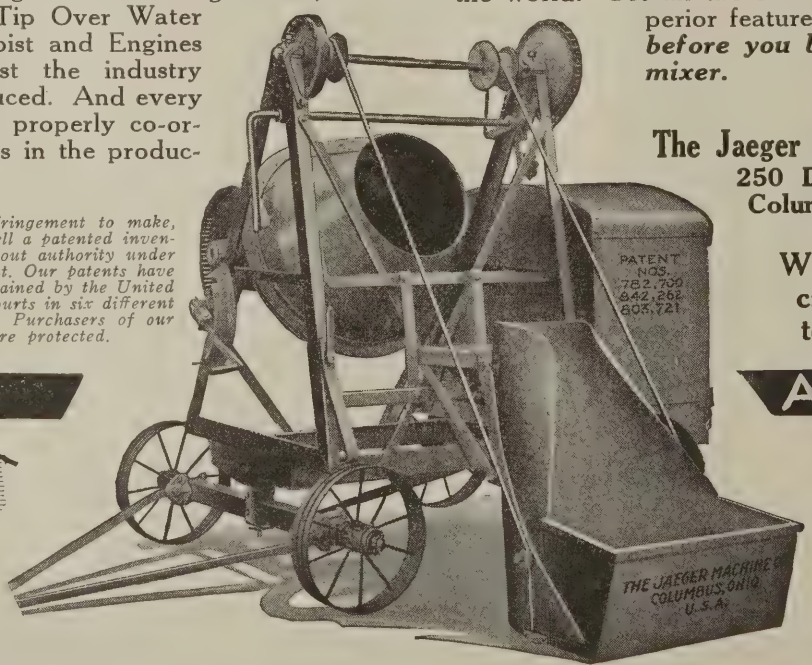
Every Jaeger Display Room a Complete Mixer Show in Itself!

THE Jaeger Line includes 24 different outfits, in four different sizes—mixers with and without loaders, hoists, water tanks, engines—mounted on trucks or skids—equipped with steel wheels or wheels with rubber tires. Big and small mixers—ranging in capacity from 2½ cu. ft. to 14 cu. ft. mixed concrete. Every model of known efficiency and dependability!

Every Unit Built Right

If your requirements demand a heavy duty mixer, by all means get the facts about the big-capacity Jaeger models. They have built a world-wide reputation. Long experience and engineering skill have made every Jaeger unit—Tilting Drum, Power Loader, Tip Over Water Tank, Hoist and Engines—the best the industry has produced. And every unit is as properly co-ordinated as in the production of a high-grade automobile or truck.

That's why Jaeger heavy duty mixers, as well as the smaller models, have set the standard for the concrete mixer industry—a standard that is recognized throughout the world. Get all the facts about the superior features of the Jaeger ***before you buy your next mixer.***



The Jaeger Machine Co.
250 Dublin Ave.
Columbus, Ohio

Write for catalog today!

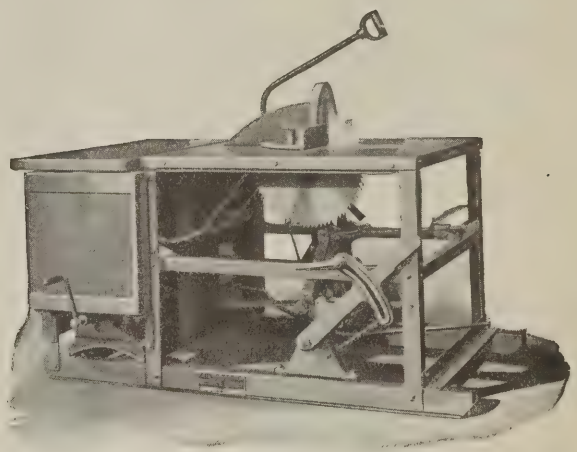
It is infringement to make, use or sell a patented invention without authority under the patent. Our patents have been sustained by the United States Courts in six different instances. Purchasers of our Mixers are protected.

A MIX A MINUTE

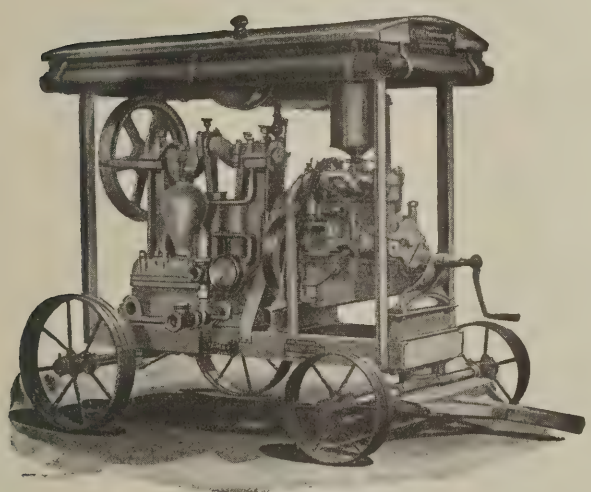
C H & E

"The Guaranteed Line"

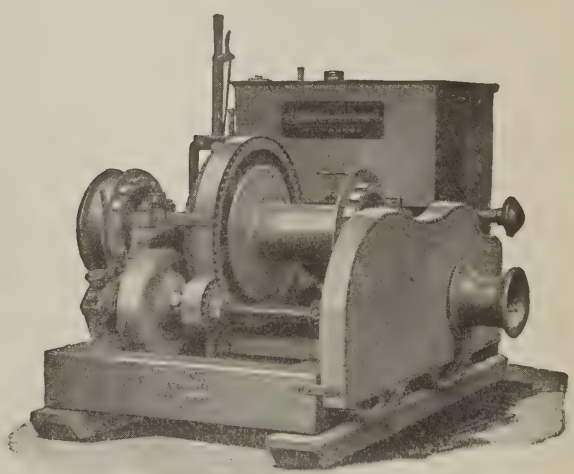
No. 1—Mortar Mixer



No. 15—Saw Rig



No. 9—Triplex Pump



No. 14—Reversible Hoist

Send for complete catalog just off the press. Do it now.

C. H. & E. Manufacturing Co., Inc.

319 MINERAL ST. **MILWAUKEE, WIS.**

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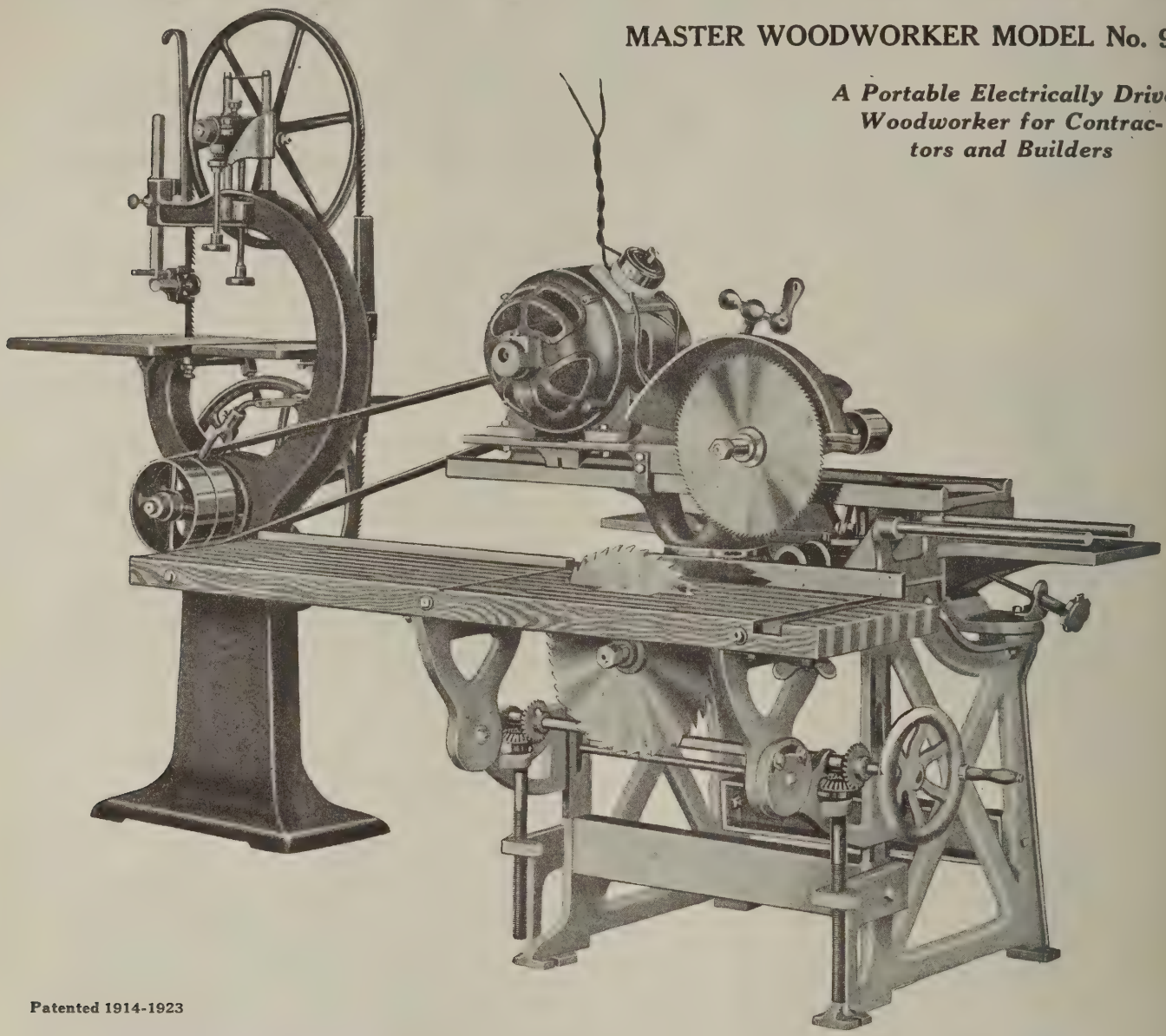
THE "MASTER" WOODWORKER

MASTER WOODWORKER MODEL No. 9E

A Portable Electrically Driven Woodworker for Contractors and Builders



Patented 1914-1923

THE MASTER WOODWORKER IS THE BEST LABOR SAVER ON THE MARKET

A Combination of Real "Power" and "Portability"
Not a "Saw Rig"—But the "World's" Best "Woodworker"—"The Master"

The Master Woodworker is so constructed that by loosening four bolts the machine may be divided into four parts, the heaviest of which weighs 200 pounds. It is nothing more than a two-man job. For interior work the machine cannot be excelled, as when table is removed, same may be taken through a 2′ 6″ door, and taken from room to room. This alone should be convincing—it does not take a machinery mover to take it from job to job, but merely a Ford pickup box.

The Master Woodworker Is PORTABLE

When building you can put up a shed and have a temporary service put in, and make all frames, and stair work, cut joists, fence boards, flooring, siding, bridging, rafters, roof boards, shingles, and all other cuttings on the job. The finishing work cut, and dado door jambs, casings (square or mitred), cut threads, risers and wedges. Rout out door strings, cupboard doors, drawers, and shelving, fit doors and sash and mortise locks, there is no cut on the job that cannot be made by the Master Woodworker.

Sawing by hand is a waste of labor—trying to do the work with old style machinery is a waste of money.

In keeping up with Progress, the best in PORTABLE woodworkers has been designed by practical engineers.

THE MASTER WOODWORKER for Builders and Contractors is actually the Simplest and the Best that human ingenuity could possibly devise.

How many times have you paid for a MASTER WOODWORKER?

Do you realize that it will pay for itself on the first job? In fact you are paying for it every day in your hand sawing hours. Why not stop the waste? Successful contractors and lumber dealers do not use hand saws.

Why do you?

The MASTER—the fastest and best Woodworker on the market—can be bought with a small payment down. Put it on your pay roll!

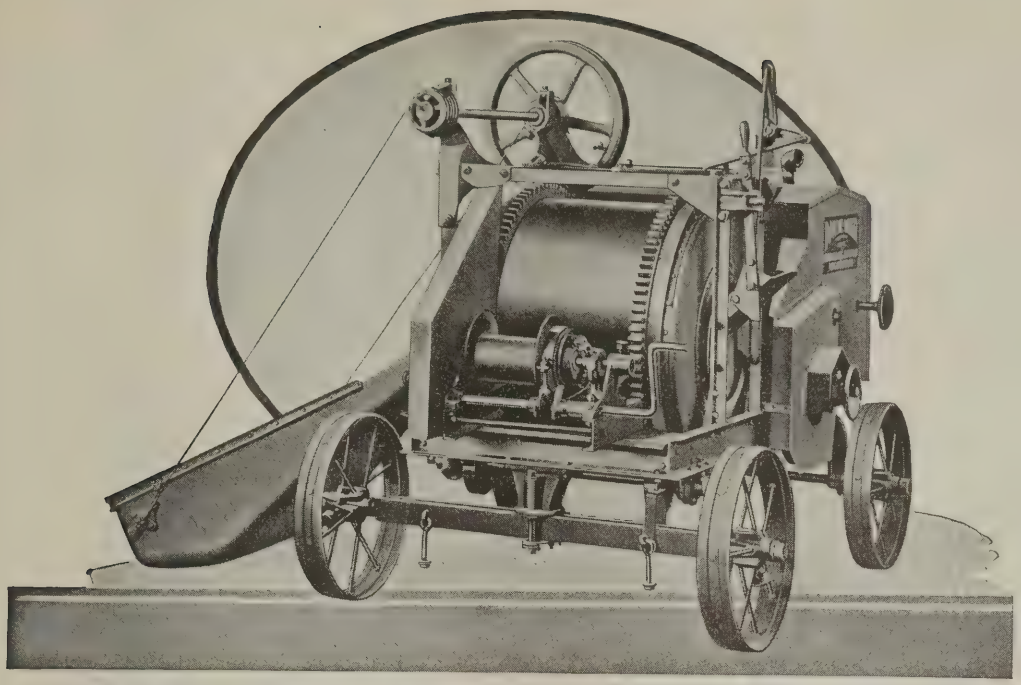
Make it pay for itself and collect some real profits.

There is big money in contracting with a MASTER WOODWORKER.

CATALOG ON REQUEST

The Master Woodworker Manufacturing Co., Inc.

612 BRUSH STREET **DETROIT, MICHIGAN**



Send Coupon or write for Full Information

Mixes both mortar and concrete! Hoists.

FIRST of all the Koehring Dandie is a strongly constructed concrete mixer, but because of its mixing action it also mixes mortar. No changes needed! Always ready to go on either a mortar or concrete job. That's getting fullest use and return out of equipment investment. And in addition there is a light duty hoist attachment.

At the same time you are always ready to do a concrete job—foundations, silos, footings, culverts, sidewalks, drives, alleys, etc. The Koehring Dandie is the dependable light mixer — built with Koehring construction. Big volume production and standardization keep price down — gives you a dependable concrete mixer, interchangeable for mortar mixing at a light mixer price.

Capacities

4 and 7 cu. ft. mixed concrete. Gasoline or steam. May be equipped with low charging platform, batch hopper, automatic water measuring tank, light duty hoist, steel or rubber tires.

KOEHRING DANDIE

KOEHRING COMPANY
Manufacturers of Concrete Mixers and Cranes, Excavators and Power Shovels
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Sales offices and service warehouses in all principal cities.
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Canada, Koehring Company of Canada, Ltd.,
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Mexico, F. S. Lapum, Cinco De Mayo 21, Mexico, D.F.

KOEHRING COMPANY
MILWAUKEE, WIS.

Please send me Koehring Dandie Mixer Catalog No. 12 and give full information on interchangeability for mixing concrete and mortar.

Name _____

Address _____

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Fireproof, Permanent
AMBLER ASBESTOS SHINGLES

These are views of the reconstructed Rancocas Stock Farm buildings at Jobestown, N. J. Zev, who won the great race from Papyrus, is safely housed here

An interior fire quickly burst through the original roof and spread before the valuable stock could be removed. The loss of valuable blooded horses was estimated to be in excess of $700,000.

The owner, desiring a fireproof roof, covered his new buildings with Ambler Asbestos Shingles—"Permanent as the Everlasting Hills." The track itself is three-eighths of a mile long. Some 950 squares of shingles were used in the complete roofing.

Ambler Asbestos Shingles are composed entirely of the highest quality of hydraulic cement, into which a substantial mat of long asbestos fiber is interwoven. Nothing about these sturdy shingles to burn. They grow stronger as they age. Cannot curl, rust or rot. Made in three shapes for laying in American, French or Honeycomb styles and in Tuscan Red, Spanish Brown, Moss Green, Blue-Black, Newport Gray and other colors and shades.

Send for facts invaluable to architects, contractors, engineers and property-owners planning roofs for new or old buildings.

Asbestos Shingle, Slate & Sheathing Company

Department B **Ambler, Penna.**

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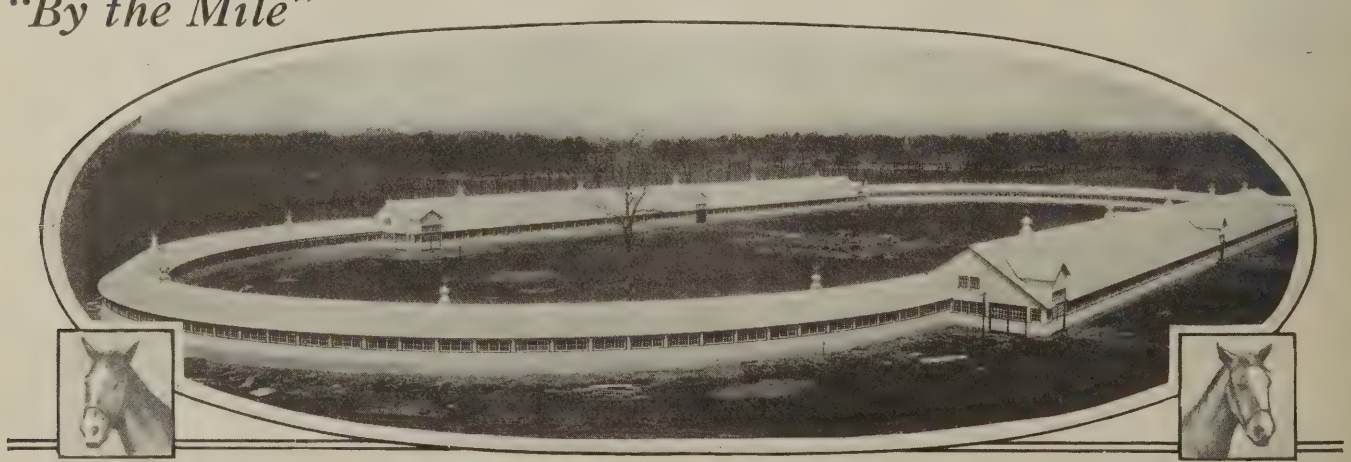
"By the Mile"



RICHARDSON
Product

From the makers of Flex-a-tile Housetops, Viskalt Membrane Roofs, Viskote, Wall Board, and similar products

One of the tiny flakes of slate (greatly enlarged) which are enameled upon the Richardson Super-Giant Shingle. Each flake is merely a miniature of the great blocks of slate from which it was broken. It can no more change color than the huge blocks themselves

Roofing beauty as *lasting* as the hills from which it comes

Here's a beautiful new roofing color in slate that can never fade! A blast in the Georgia hills revealed it—*weathered brown* with its rich, mellow beauty of autumnal woods.

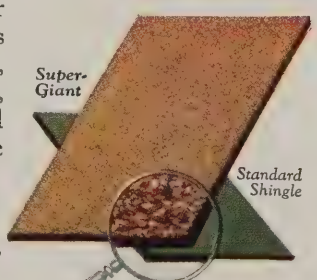
Centuries of pressure under mountains of earth and rock have fixed its color into the very structure of the slate. The most rigid weathering tests fail to affect it.

The permanent color effects of the weathered brown have delighted architects, especially when it is blended with other Richardson shingles of jade green, tile red, or black pearl. To you, it gives an exceptional opportunity to secure new customers.

A super-shingle

Weathered brown is used exclusively on the Richardson Super-Giant Shingle—a unique roofing product which in addition to its beauty, offers you an unusual degree of roofing serviceability. For example, its greater size (10″ x 14″) saves 35% in cost of laying. Its 50% greater thickness makes it last much longer, and cast a deeper shadow line on the roof. And its 100% greater stiffness keeps it rigid and firm in all kinds of weather.

Moreover, its inner materials, felt and asphalt, give conclusive evidence of its endurance. Richardson felt has for fifty years been recognized as the best. And the asphalt which goes into it is of the highest grade raw materials refined by a special Richardson process.



The Super-Giant Shingle—50% thicker, 100% more rigid, and 35% more economical in cost of laying

Prove the facts

A super-shingle indeed, when you weigh its points one by one! First—absolutely exclusive color effects. Second—unusual dimensions which give added life to the roof at ⅓ less in cost of laying. And finally—exceptionally high test standards in its materials.

These definite talking points—especially the exclusive color effects—will bring you new customers. And, of course, Richardson Super-Giants are equally good for new or "over the old roof" jobs.

Send for our beautiful new booklet, *Roofs of Distinction*, together with samples of Richardson Super-Giant Shingles in *weathered brown* and other colors. For every roofing use there is a Richardson product—from Lok-Top Asphalt Shingles to Rubbertex Roll Roofing with Pyramid Kaps. Just use the coupon below.

The RICHARDSON COMPANY
Lockland (Cincinnati) Ohio

Melrose Park (Chicago) Ill. New Orleans, La.

RICHARDSON ROOFING

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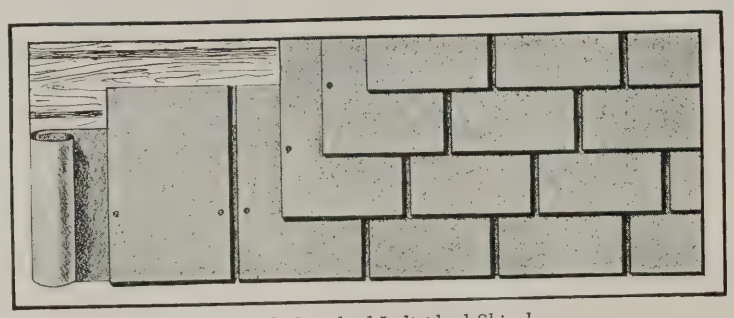
Clip and mail this coupon

The Richardson Company
Lockland, Ohio

Gentlemen:
Please send me samples of Richardson Super-Giant Shingles, your new booklet and further facts about Richardson Roofing.

Name.....

Address.....



Flex-a-Tile Standard Individual Shingles

You can always sell a RICHARDSON *Product* *for* every roofing use

In addition to the Richardson Super-Giant Shingle described on the other side of this page, there are many other Richardson products—one, in fact, to fit every roofing need. Thus, no matter whether your customer emphasizes endurance, beauty or economy in the roofing he selects, you can be sure to please him.

Here are a few of the Richardson products. Like the Richardson Super-Giant Shingle, each one contains quality materials adapted to a specific use.

Other Richardson Shingles

Lok-Top Asphalt Shingles give at remarkably low cost a locked-down roof of good appearance and sturdy endurance. Surfaced in jade green, tile red, or black pearl slate.

Flex-a-tile Style 4 Slab Shingles, measuring 10 in. x 32 in., combine 4 shingles in one. Being self-spacing, they are easily and quickly laid, and come surfaced with jade green, tile red, or black pearl slate.

Flex-a-tile Standard Individual Shingles, as shown above, are stiff, strong, and uniformly well made for a wide variety of uses. Surfaced in jade green, tile red, or black pearl slate.

Richardson Roll Roofing

Rubbertex Roll Roofing is a flexible, durable, all-purpose product especially good for factories, warehouses, barns, and garages. It should be applied with Zinc Pyramid Kaps.

Flex-a-tile Shingle Roll Roofing with a permanent shingle design **embossed** right on the roll gives at very low cost the effect of individual shingles. It can be laid equally well over old shingles or new sheathing, and is surfaced in jade green or tile red slate.

Flex-a-tile Slate Surfaced Roll Roofing combines the high quality of Richardson products with the economy of roll roofing. Its firm surface of jade green or tile red slate flakes is enameled on to stay. Packed with Zinc Pyramid Kaps.

Other Richardson Products

Viskote—a sanitary sound deadening and insulating material, is especially suitable for laying under linoleum. It is also used as insulation between walls and beneath floors.

Viskalt Paints, Cements, Coatings include an extensive variety of protective products which it will pay you to follow up.

As you see, these principal Richardson products fit every type of customer, every kind of roofing problem. And remember—one Richardson Roofing job sells another. For complete details and for our latest price list, write us today.

The RICHARDSON COMPANY

Melrose Park (Chicago) Illinois Lockland (Cincinnati) Ohio New Orleans, Louisiana

RICHARDSON ROOFING

First Impressions

—are lasting ones.

No part of a house is more important in creating a favorable impression than its roof.

It must be unobtrusive, yet, through the quiet dignity of its beauty, harmonize so perfectly with the rest of the scheme as to appear a part of the whole, not an added feature.

REYNOLDS SHINGLES are beautiful the day they are laid. Nature's weathering enhances their beauty with the passing years.

They grow old gracefully.

H. M. REYNOLDS SHINGLE CO.
Grand Rapids, Michigan

APPROVED BY THE TRADE MARK H.M.R. ESTABLISHED 1868 UNDERWRITERS LABORATORIES

The Wardman Park Hotel, Washington, D. C., built with Herringbone solid partition construction.

"Just Why I Use Herringbone Solid Partitions"

"Because they can be built for much less money than any other type of fire-resistive partitions and ceilings."
"Because such partitions save floor space and provide greater room area."
"Because they weigh less than other types of fire-resistive partitions and consequently save cost in framing and foundations."
"Because they afford fire protection at minimum cost."
"Because they prevent unsightly cracks."
"Because they are soundproof."

A Statement by Harry Wardman

Herringbone Solid Partitions Save Space In This Hotel

The two-inch solid partition of Herringbone Rigid Metal Lath on GF Cold Rolled Channels, substituted for walls of ordinary four inch block construction, effects a saving of one square foot of floor space for every six running feet.

In a typical 500 room hotel this saving amounts to 7,000 square feet of floor space. This is the equivalent of about twenty rooms. At a rental of $5 a day per room, Herringbone thus affords an *additional income* of $36,000 per year.

The two-inch plaster wall formed by Herringbone on GF Channels is fire-and-sound proof, light, rigid and sanitary. It is the ideal partition for apartments, hotels, hospitals and office buildings.

GF solid partition construction saves labor and material costs in erection. Specify it for economy.

Other GF Materials

Self-Sentering—A combined form, lath and reinforcement.

Trussit—A reinforcement for solid partitions.

GF Expanded Metal—A concrete reinforcement.

GF Steel Tile—For concrete floors.

GF Steel Lumber—Used in place of wood joists and studs.

GF Steel Channels—Studding for solid partitions.

GF Peds—Spot grounds for attaching trim to concrete and plaster.

GF Waterproofings—For concrete and masonry.

Write for illustrated literature.

RMCO

GF Herringbone Rigid Metal Lath

THE GENERAL FIREPROOFING CO., *Youngstown, Ohio*

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Steel Windows *for* Apartment Houses

APARTMENT house owners find Lupton Residence Windows a profitable investment in many ways.

Their casement-like beauty is welcomed by tenants.

Their slender, copper-steel frames admit more light. Their outswung ventilators and high openings invite the breeze.

The Lupton "projected" movement permits washing *both* sides from within the room. No safety belts and no risk.

Best of all—air leakage is reduced, and the periodical refitting expense is saved, by the use of steel instead of wood.

May we send the catalogue?

DAVID LUPTON'S SONS COMPANY
Allegheny Avenue and Janney Street Philadelphia

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**Warehouses in these cities*

There's a dealer near you

Bolton Square Apartment Hotel in Cleveland, Ohio, designed by Watson Eng. Co. and erected by Crowell & Little Const. Co. Lupton Residence Windows were used throughout this up-to-date building.

You Buy and Sell With Safety When a Home Is Holland Heated

Take your buyer in the basement of a home you have to sell. When you show him the name "HOLLAND" on the furnace he knows he can heat the home comfortably in any kind of weather. He is not obliged to build a fire or test the furnace. The name "HOLLAND" assures him that the furnace was engineered into the home under the conditions of the signed HOLLAND BOND, which is good for five years and transferable when the house is sold. This bond puts all the responsibility on the World's Largest Installers of Warm Air Furnaces, who assume this responsibility to builder and home buyer alike.

Such insured healthful heating is likewise a protection to builders and sellers, for they can truthfully and calmly say—"You may be sure of warmth and healthful air—a million people know and enjoy the Holland Furnaces."

No cost for full data and information.

HOLLAND FURNACE COMPANY

Directly and Solely Responsible to You

World's Largest Installers of Furnaces

General Office: HOLLAND, MICHIGAN **Two Factories: Holland, Michigan, and Cedar Rapids, Iowa**

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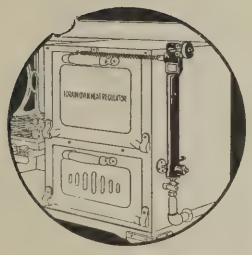
The Cooking Appliance Most Popular with the American Housewife

The Rogers Apartment, Knoxville, Tenn. M. E. Parmelee & Sons, Architects, Knoxville, Tennessee. Kitchens throughout equipped with Direct Action Gas Ranges with Lorain Oven Heat Regulators.

One easy turn of the Lorain Red Wheel gives the housewife a choice of 44 measured and controlled oven heats for any kind of oven cooking or baking.

THE particular cookery equipment the average American housewife hopes some day to possess is a gas range equipped with the famous

LORAIN OVEN HEAT REGULATOR



View of construction of the Lorain Oven Heat Regulator as applied to the gas range oven.

These famous gas stoves are equipped with the Lorain Oven Heat Regulator: Reliable, Clark Jewel, Dangler, Direct Action, New Process and Quick Meal.

This remarkable device automatically controls the oven heat at any desired cooking temperature thereby making possible many unusual cooking feats. Moreover, it relieves the housewife of the constant watching of food and fire when baking and cooking.

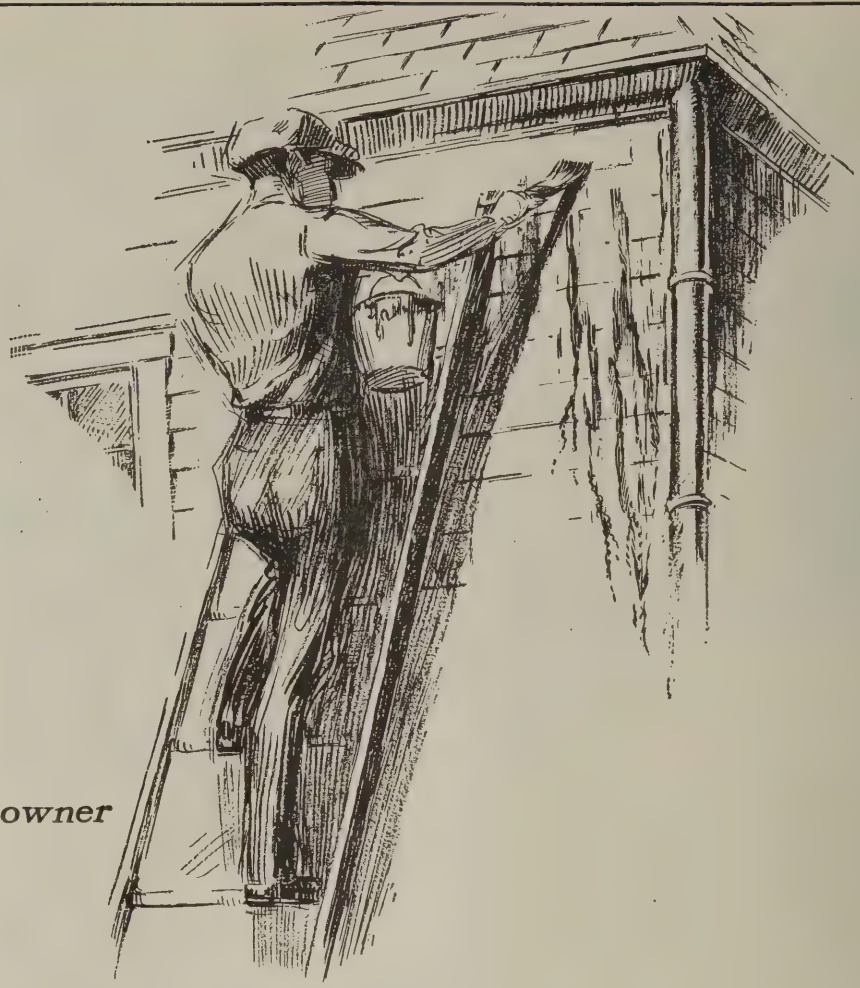
Most every woman knows something about these celebrated stoves because they are demonstrated, sold and serviced by more than 13,000 agencies, and because for five years a big national advertising campaign has been telling her of the unusual advantages of the Lorain Oven Heat Regulator.

Architects and builders should not forget that Lorain-equipped Gas Ranges always appeal to women. And that's why Lorain is being specified more and more for the kitchens of fine apartment buildings, houses, schools, churches, hospitals and other types of structures.

Catalogs and data of special interest to architects gladly sent upon request. For specfic data see pages 2315-2324 inclusive, Eighteenth Edition Sweet's Architectural Catalog.

AMERICAN STOVE COMPANY, 2212 Chouteau Ave., St. Louis, Mo.

Largest Makers of Gas Ranges in the World



Told by a Yonkers home-owner

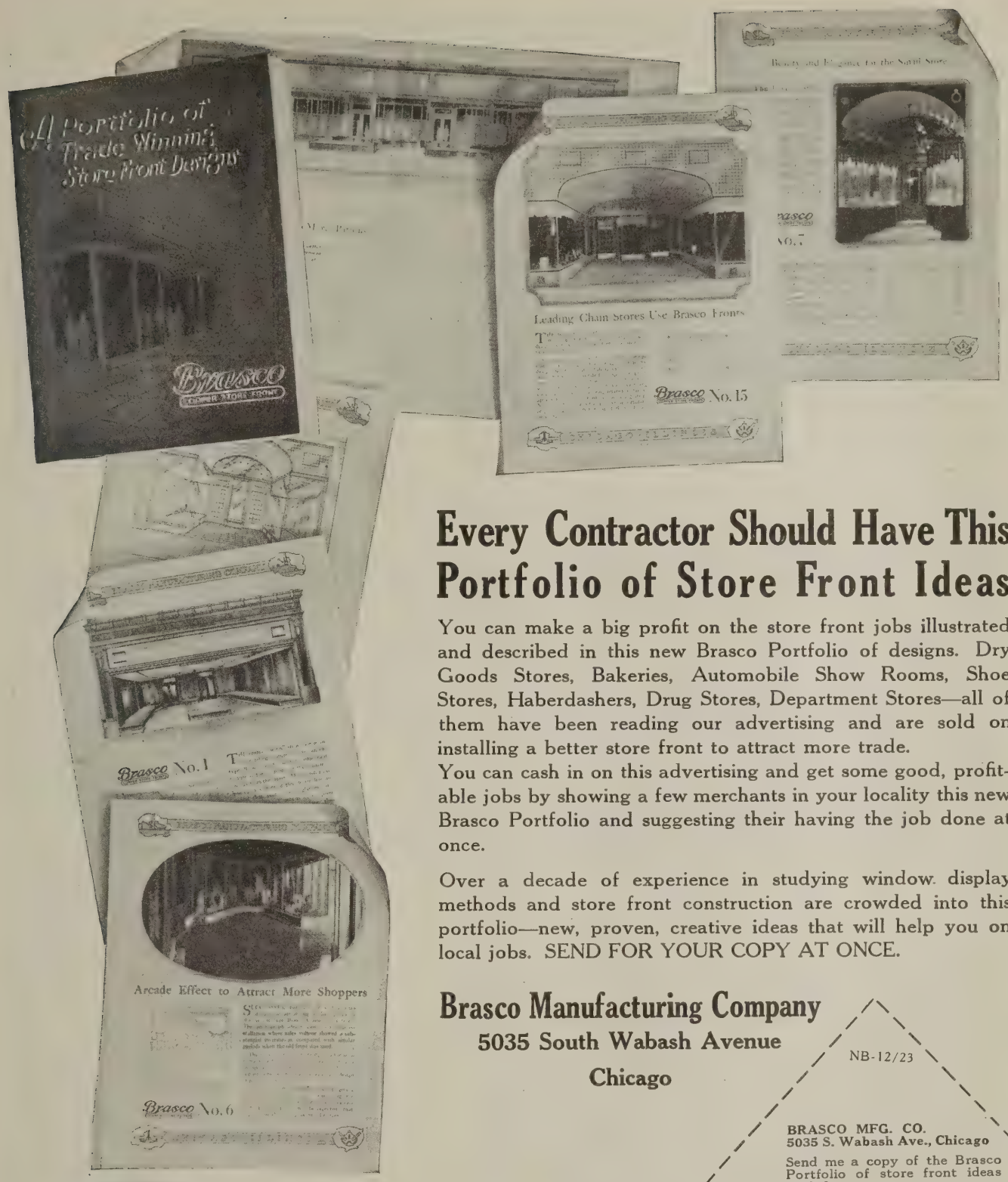
How Copper on the House Loosens the Banker's Purse Strings

"I was busy painting over the rust streaks that had been carried down the sides of the house from the old leaders and gutters when the bank representative came along. He looked up, saw me, saw the new Copper leaders and gutters, smiled, and said: 'Mr. ———, a house as well taken care of as yours, is a good investment. We will take over that mortgage'."

(Mr. ——— had applied to his local bank to take over the mortgage on his house in order to get the advantage of a better rate of interest).

From every angle—to eliminate costly repairs and replacements, to protect the value of the house—it pays to install Copper leaders, flashings and gutters, and Brass pipe plumbing. Copper and Brass never rust and do not deteriorate with age as do corrodible substitute materials.

COPPER & BRASS
RESEARCH ASSOCIATION
25 Broadway - New York


A Portfolio of Trade Winning Store Front Designs
Brasco
COPPER STORE FRONTS
Leading Chain Stores Use Brasco Fronts
Brasco No. 15
Brasco No. 1
Arcade Effect to Attract More Shoppers
Brasco No. 6

Every Contractor Should Have This Portfolio of Store Front Ideas

You can make a big profit on the store front jobs illustrated and described in this new Brasco Portfolio of designs. Dry Goods Stores, Bakeries, Automobile Show Rooms, Shoe Stores, Haberdashers, Drug Stores, Department Stores—all of them have been reading our advertising and are sold on installing a better store front to attract more trade.

You can cash in on this advertising and get some good, profitable jobs by showing a few merchants in your locality this new Brasco Portfolio and suggesting their having the job done at once.

Over a decade of experience in studying window display methods and store front construction are crowded into this portfolio—new, proven, creative ideas that will help you on local jobs. SEND FOR YOUR COPY AT ONCE.

Brasco Manufacturing Company
5035 South Wabash Avenue
Chicago

NB-12/23

BRASCO MFG. CO.
5035 S. Wabash Ave., Chicago

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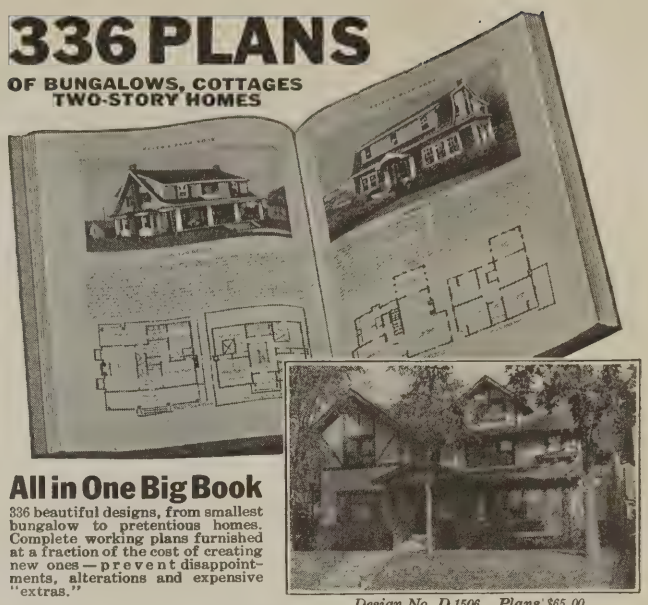

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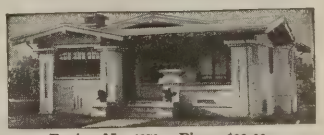

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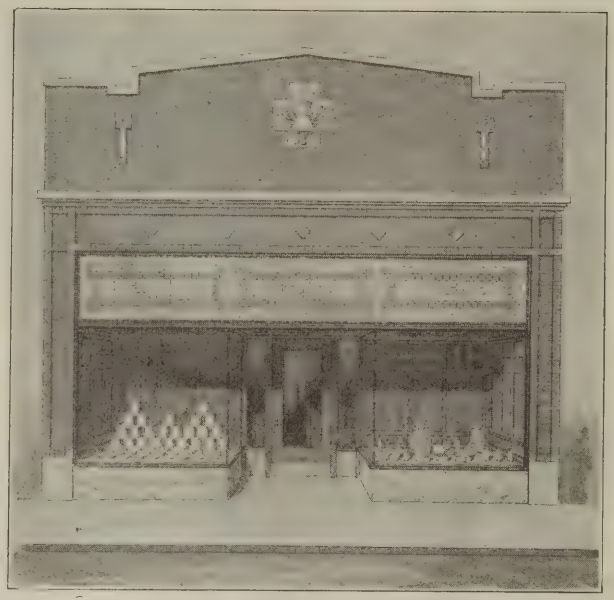

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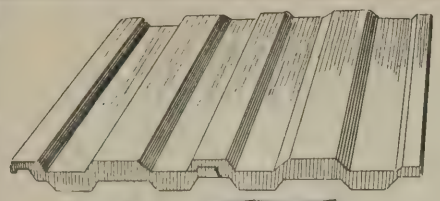

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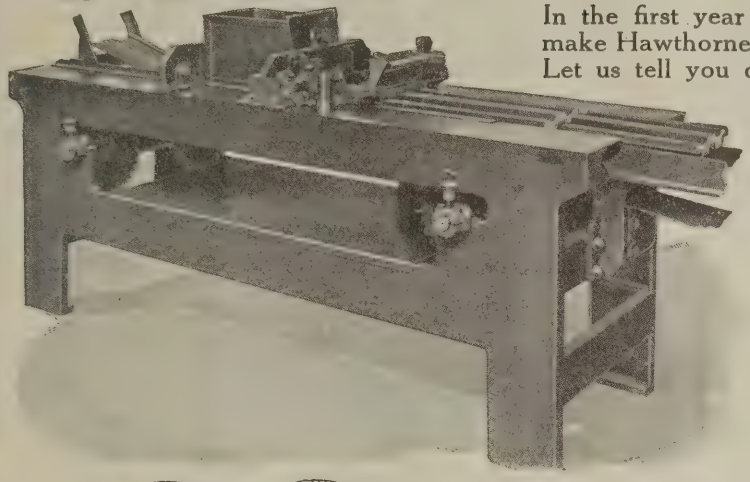

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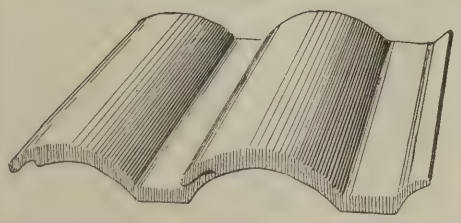

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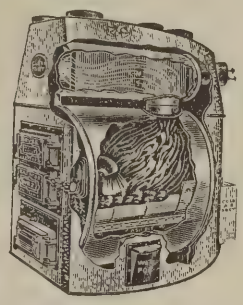

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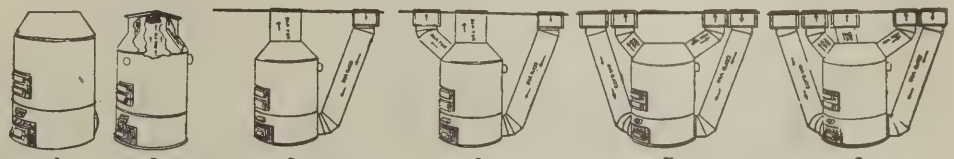

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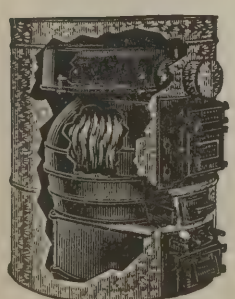

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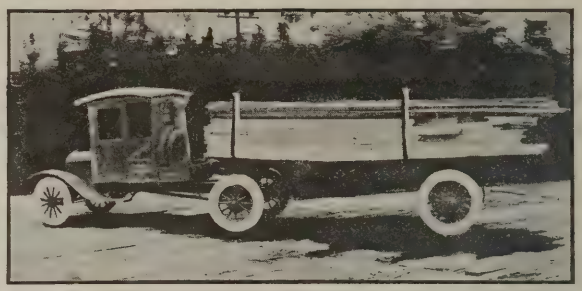

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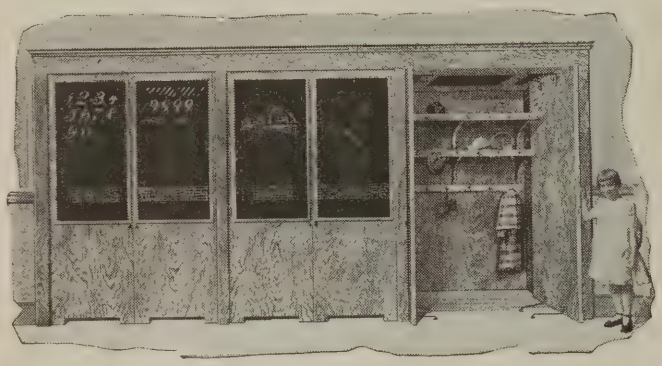

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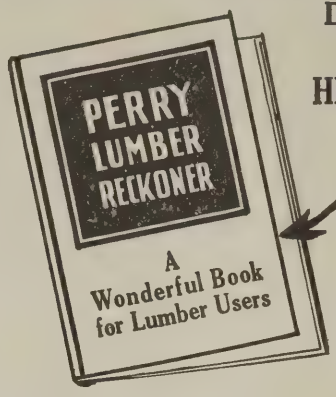

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Fig. 157

Note the construction of patent Interlocking Device used on Edwards Metal Shingles and Spanish Tile.

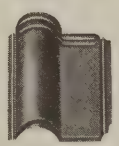
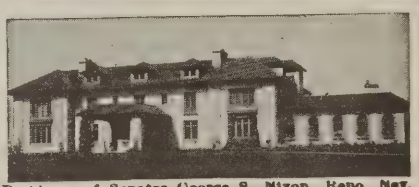


Fig. 367

Metal Spanish Tile for main part of roof.

Edwards "Queen Anne" Metal Shingles



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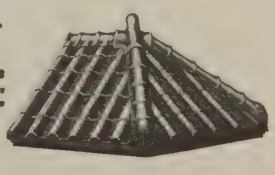

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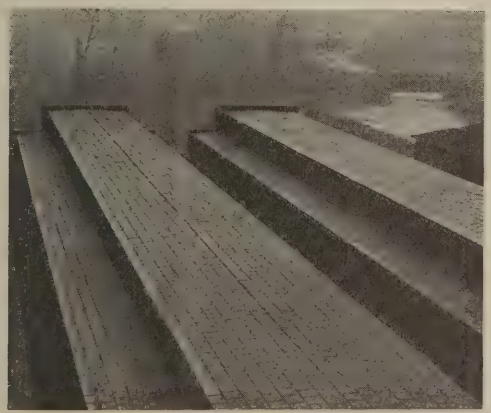

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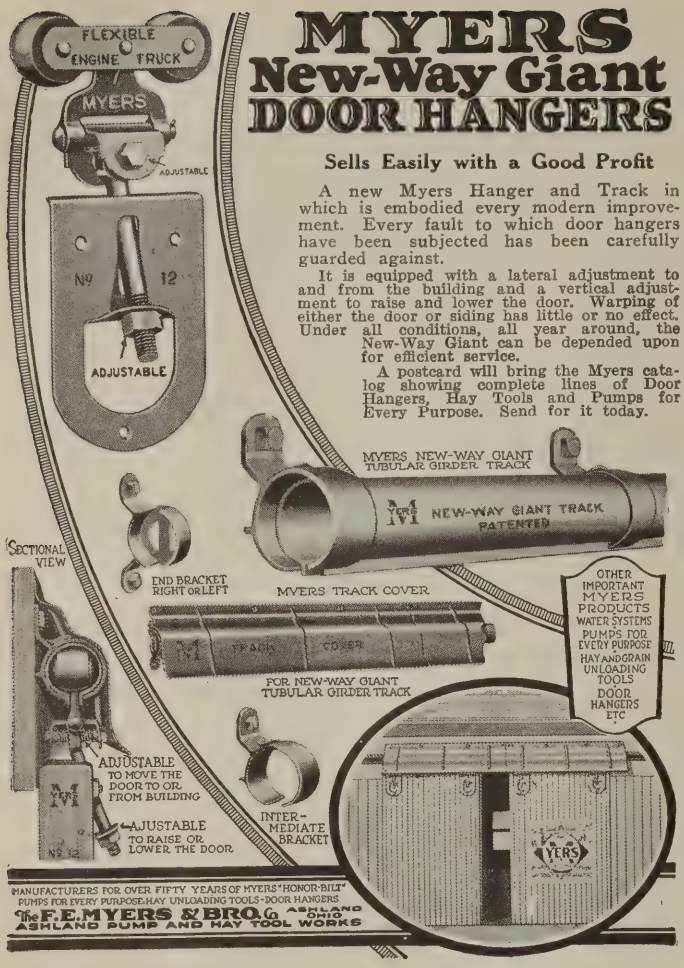
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THE BENNETT MANUFACTURING COMPANY

Alden, Erie Co., N. Y., U. S. A.

DOUBLE PROFITS

Pipe, Tile and Culvert Molds
All Sizes
$16.00 up

Chimney and Porch Mold
$6.00

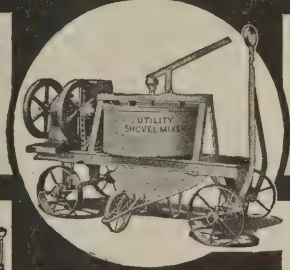
Flower Box Mold
$23.00

Vase Mold
$24.80

There is BIG money in concrete work for the man with UTILITY equipment. Costs no more, but gives best results. Order direct or write headquarters for complete catalog and prices.

Concrete Equipment Co.
530 Ottawa Ave.
Holland, Mich.

Porch Outfit Complete
$59.80



Utility Brick Machine
$69.90

$15.00
Complete Block Outfit

$68.00
Complete Block Making Outfit

UTILITY CONCRETE EQUIPMENT

The Original and Only

"WHITE-STEEL"
REGISTERED

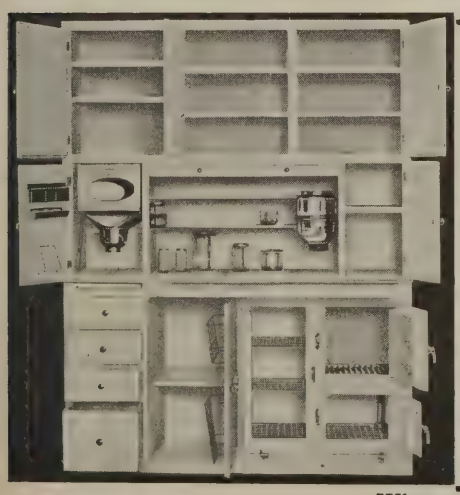
First Consideration of Finest Hotels

"White-Steel" products are found in the bathrooms of the world's finest hotels. Medicine Cabinets made of the world famous Henzin Metal—a rust-resisting material—and permits the six coats of "White-Steel" enamel to stick for all time. Enamel will not check, peel, craze or discolor. Solid construction. Cabinet made of two pieces. First quality mirror plate. Polished plate glass shelves. The ideal cabinet for homes and apartments. "White-Steel" is the owner's only assurance of a permanent installation.

Medicine Cabinets for the Home!

Contractors and Builders:
Write for Details

"WHITE-STEEL" SANITARY FURNITURE CO.
Grand Rapids Michigan
Dept. 112



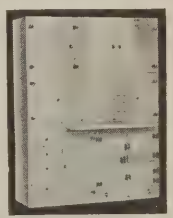
"KOZY-KITCH" Kitchenets

Used in the Finest Homes and Apartments, from coast to coast, because of their

Beautiful appearance ***Economy of space***
Efficient design ***Saving in costs***

A wonderful combination of necessary features for the efficient and economical planning of apartment and residence kitchens. Pleasing alike to the architect, builder, owner and tenant. Better rentals and quicker sales.

Made RIGHT or LEFT hand (cut shows right hand), and for FRONT, REAR or END icing. REAR or END parcel and garbage service. Can be BUILT-IN or SET-IN. Includes large refrigerator together with all the conveniences of the modern kitchen cabinet. Extra large storage capacity. Entirely inclosed with sanitary lap front doors and roll curtain. Beautiful white enamel finish, exterior and interior.



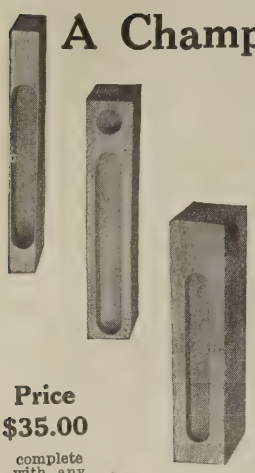
Model A Closed. Large Cut, Model A Open

Write for catalog showing complete details and arrangements.
Buy direct from the Manufacturers

LAGRANGE FIXTURE SALES CORPORATION

150 East Spring Street **LaGrange, Indiana, U. S. A.**

A Champion in Performance as Well as in Name!



The Champion Mortiser
Cuts a Perfect Mortise in a Minute or Two

—has no equal in making perfect mortises easily, speedily and economically in any kind of wood. Here are eight reasons why you can't afford to be without it.

Cuts a perfect mortise from round hole to 6″ slot in three to five minutes. Uses ¼″, ⅜″, ½″, ⅝″ and ¾″ bits. Special sizes up to 1¼″.

Has three speeds for different woods—hard, soft, cross-grained and end wood.

Adaptable to any kind of mortising. Especially suited for work on doors, screens, sash, etc.

Mortises wide stock as well as narrow. Special base (as illustrated) furnished on request.

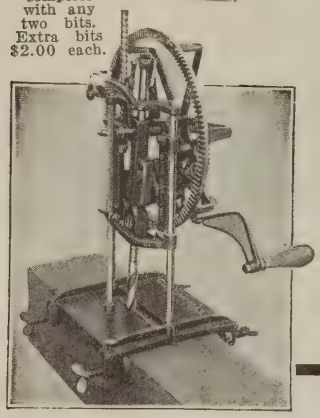
Perfect mortises at the rate of 100 to 120 daily are common with the Champion.

Is practical machine for contractors, carpenters and cabinet makers.

Operates simply and easily — experience unnecessary.

Nothing to get out of order. Sold on a money-back guarantee.

Price $35.00
complete with any two bits. Extra bits $2.00 each.



Send for a CHAMPION today. If not satisfied after ten days' trial, return machine at our expense and get your money. Our guarantee protects you!

Men wanted to sell the Champion Mortiser. Write for particulars.

COLGAN MACHINERY & SUPPLY CO.
112 Hayden Bldg. Columbus, Ohio

Hoover "Home, Sweet Home"
built with Blocks from
Anchor
Concrete Machinery

Write for interesting folder describing this Model Home
Complete Block-Brick-Tile Equipment
ANCHOR CONCRETE MACHINERY CO.
534 Dublin Avenue Columbus, Ohio.

This is the band saw for your shop!

THERE are three big reasons for choosing a Parks band saw when you buy.

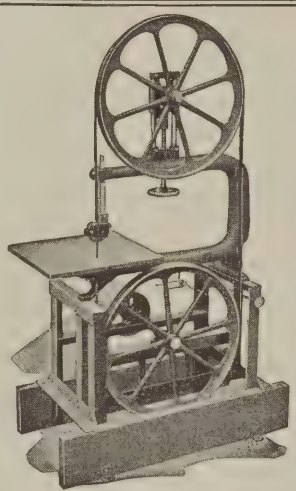
1. Because you need a machine at the right price to speed up your work and increase your output.

2. Because a Parks band saw is real machinery quality, durable, strong, sturdy and guaranteed for 10 years.

3. Because you get a better machine for less money as a result of Parks manufacturing advantages.

Parks machines have no competitors when judged by quality of work turned out, durability, and low price.

Send for the Parks machinery catalog.



Parks 18-in. "Rex" Band Saw $50.
Parks 22-in. "Jewel" Band Saw $75.
Parks 30-in. "Century" (illustrated) $100.
Parks 35-in. "Jumbo" Band Saw $125. Prices net. F. O. B. Cin. O.

The Parks Ball Bearing Machine Company
Knowlton and Langland Street Cincinnati, O.
Canadian Factory: 200 Notre Dame East, Montreal, Can.
9-23

PARKS
WOODWORKING MACHINES

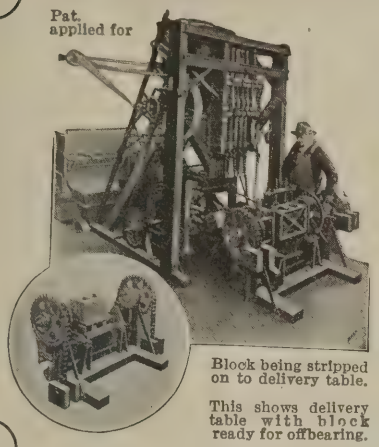
Never a shut down with a HERCULES *on the job*

Hoisting, Concrete Mixing, Air Compression, Dimension Sawing and fifty other contractor's service jobs.

Though the man a contractor puts in charge of his HERCULES Engine is seldom anything of a machinist, this staunch powerplant is built so nearly foolproof that that doesn't matter! Put a Hercules on any job of yours, and you'll never have to shut down on account of engine trouble. There is a size built to fit your work to a T. Let us send you the particulars.

The Hercules Corporation
Engine Div., Dept. F Evansville, Ind.

HERCULES ENGINES


Pat. applied for

Block being stripped on to delivery table.

This shows delivery table with block ready for offbearing.

Now is the time to consider Spring, 1924—now is the time to install your machines and make up your Blocks!

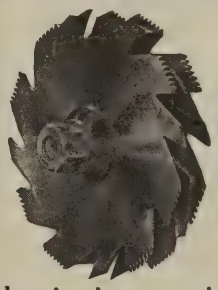
"Off with the Old On with the New"

You can WIN with the ever-dependable, speedy Ideal trade mark **Roll-Over Stripper**

Write us today!

THE IDEAL CONCRETE MACHINERY COMPANY
5002 Spring Grove Ave., Cincinnati, O.

You Need a HUTHER Dado Head



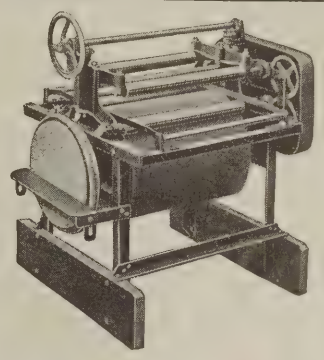
The saw that makes intricate cutting and grooving simple.

This saw, developed from our own patents, consists of two outside cutters and a sufficient quantity of inside ones to perform the required cut. The outside cutters can be used singly or in pairs as required.

Every builder or contractor, wishing lock corners or any sort of grooving, will find his production costs lwered by this saw.

Write for complete information and prices, or send for one on approval. It may be returned at our expense if unsatisfactory.

Huther Bros. Saw Mfg. Co.
Rochester, N. Y.
Makers of Better Saws for More Than 50 Years



Parks Sanders

Economy 24 in. $60.
Economy 36 in. $75.
Peerless Belt Sander. $200.
24 in. Self Feed Single Drum $150. (as illustrated)
36 in. Self-Feed Single Drum $200.
24 in. Self-Feed Double Drum $275.
36 in. Self-Feed Double Drum, $350.
f. o. b. Cincinnati

Put a Parks Sander in Your Shop

PARKS sanding machines include single and double drum sanders, disk sanders, and belt sanders to meet any shop requirements.

Every Parks sander is built for hard service Rigid angle-steel electric-welded construction. Frames and drums are guaranteed 10 years. The Parks 24 in. Self-feed Sander illustrated sands material up to 4½ inches. Has handwheel adjustment for thickness. Has two-speed feed allowing coarse and fine sanding. Sand-drum is built of laminated wood covered with heavy Brussels carpet and sand paper, and is equipped with oscillating device.

Send for complete catalog of Parks machines and combination woodworkers.

The Parks Ball Bearing Machine Company
Knowlton and Langland St. Cincinnati, O.
Canadian Factory: 200 Notre Dame East, Montreal, Can.

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PARKS
WOODWORKING MACHINES

Awarded Medal of Honor, Panama-Pacific Exposition

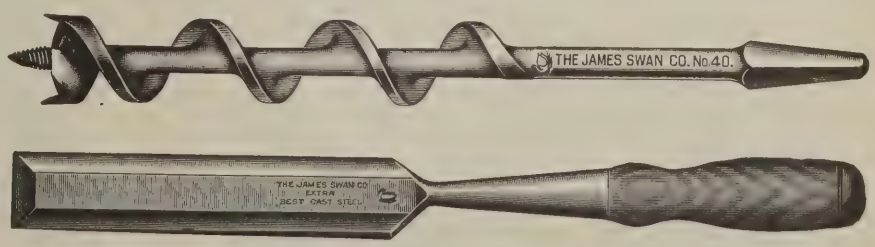
SWAN Mechanics' Tools

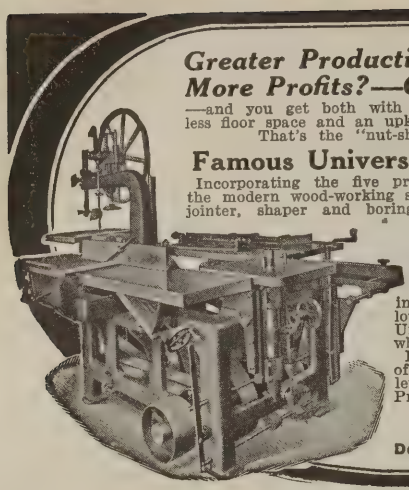
The James Swan Co.

Seymour, Connecticut

■ ■ ■

NEW YORK OFFICE
28 Warren St.





Greater Production?—Sure!
More Profits?—Certainly!

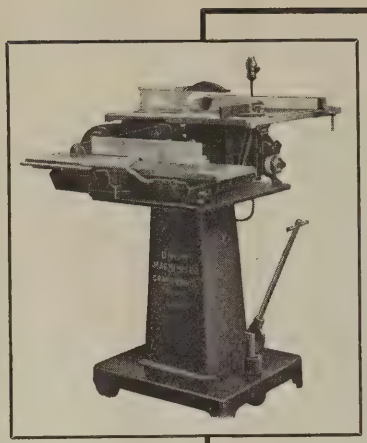
—and you get both with low first cost, less labor, less floor space and an upkeep practically nil! That's the "nut-shell" story of the

Famous Universal Woodworker

Incorporating the five principal machines found in the modern wood-working shop: band-saw, saw bench, jointer, shaper and boring machine, the FAMOUS UNIVERSAL accomplishes more results with lower cost than any other wood-working machine. For variety and volume of work, prevention of costly delays, increased production with lower labor costs, the Famous Universal makes profits grow where losses grew before.

If you make anything out of wood, send for new booklet, "Answering a Knotty Problem." It's free.

The Sidney Machine Tool Company
Dept. 712 Sidney, Ohio



Take This Machine to Your Job

It Is Really Portable

Universal Saw Table 21"x 24".

6 inch jointer 33" long.

Full ½ H. P. Motor can be operated from any lamp socket.

We will be pleased to send bulletin of our complete line of portable and bench type machines.

Gallmeyer & Livingston Co.
399 Straight Ave., S. W.
GRAND RAPIDS, MICH.

BARNES Hand and Foot Power CIRCULAR SAW

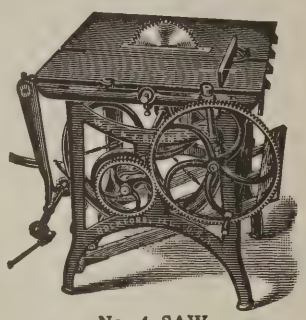
The strongest, most powerful, and in every way the best machine of its kind ever made for ripping, cross cutting and for grooving, graining, dadoing and rabbeting. Solid iron table planed perfectly true.

We make nine other machines for woodworkers.

The Only Complete Line of Such Machines Made

Catalogue Free on Application

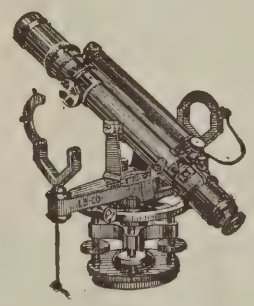
W. F. & John Barnes Company
436 Ruby St., Rockford, Ill.



No. 4 SAW

Packard
TILTER
FORD TRAILER
MIXER

MOST REASONABLY PRICED MIXER IN AMERICA
Built in All Sizes and Types.
Get New Prices—Terms. Just off Press.
THE AMERICAN CEMENT MACHINE CO., Inc., KEOKUK, IOWA
Branch Offices in All Principal Cities.



Convertible Level

The Best Gift For Yourself

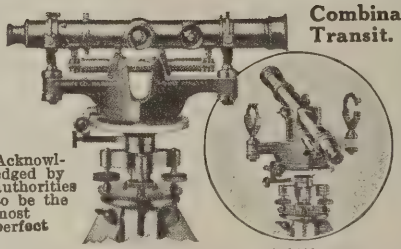
Others may get you ties, hose, slippers, cigars or a pipe,—but the best gift you can make to yourself is a new Beckmann Instrument.

It will mean more contracts and more profit for you in 1924. Ask for our 80-page catalog and FREE TRIAL OFFER.

Just mention LN-8

The L. Beckmann Co.
100 Adams St., Toledo, O.

White's Improved Convertible Level



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Combination Level and Transit. Make the Change in 10 Seconds

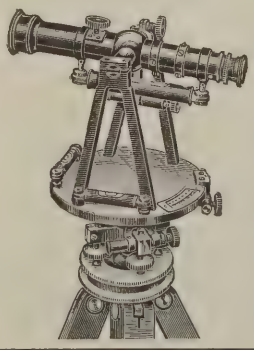
The only patented Combination Level and Transit having level bar and transit standards cast in one. Spirit level underneath telescope—in both positions therefore always protected. Does not have to be inverted when change is made. Simple in operation. No previous training required.

CONTRACTORS, ARCHITECTS, BUILDERS
find this improved convertible level-transit an indispensable help. Simple, dependable and durable—no loose parts—nothing to get out of order or adjustment. Speedy, accurate, sturdy. **10 days free trial.**

Send for catalog showing our complete line

DAVID WHITE CO., INC. 902 Chestnut St. Milwaukee, Wis.

This Transit Is Built for a Definite Work



KOLESCH "Builders" Transit

is designed for Builders, Architects and Construction Engineers, for taking angles, leveling foundations, giving lines and levels for buildings, concrete work, street and sewer work, etc. Is light, accurate and built to last.

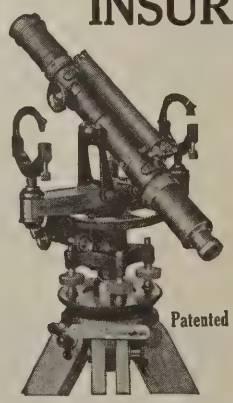
Price, complete, $140.
Send for full particulars

KOLESCH & CO.
138 Fulton Street
New York

INSURE YOUR PROFITS

with a

"STERLING" Convertible Level



Patented

Your profits and reputation for high grade work depend on your means of QUICKLY and ACCURATELY setting lines and levels. A free examination will show you why the "Sterling" is your best investment.

Write today for new Folder D-11

Warren-Knight Co.
136 N. 12th St. Philadelphia

You need this mortiser in your shop

ALMOST every job you do you need a Parks Mortiser and Borer. Handiest machine in the shop. A high-grade, guaranteed machine that will last your lifetime.

Makes mortises any size by repeating the cut, and up to three inches deep in one cut. Bed plate adjustable up and down and tilts to 45 degree angle.

Built for fast, accurate work. Adjustable to compensate for wear. Strong, rigid, electric-welded frame. 1 H. P. motor runs it.

Write for complete catalog of Parks Woodworkers describing this and other separate and combination machines.

Parks Hollow Chisel Mortiser and Borer
Guaranteed 10 years
$100
f. o. b. Cincinnati

The Parks Ball Bearing Machine Company
Knowlton & Langland St. Cincinnati, O.
Canadian Factory: 200 Notre Dame East, Montreal, Can.

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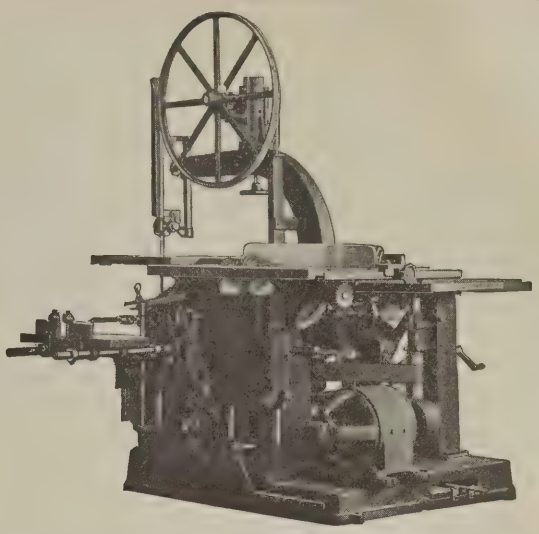
PARKS
WOODWORKING MACHINES



Each CRESCENT machine must measure up to the high standard of efficiency established during years of service in thousands of shops and factories throughout the world. The CRESCENT line is the result of years of skillful efforts continuously devoted toward the perfection of wood working machines that are substantial, efficient, practical, and entirely satisfactory to users who know quality and who demand it in their wood working equipment.

Ask today for catalog giving complete description of our line of band saws, saw tables, shapers, variety wood workers, jointers, planers, planers and matchers, table cut off saws, swing saws, disk grinders, borer, hollow chisel mortisers, universal wood workers.

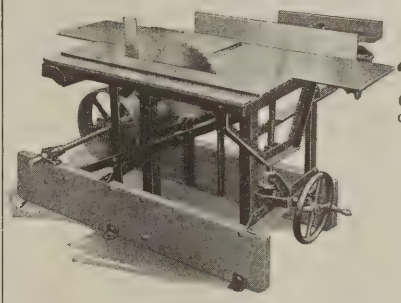
THE CRESCENT MACHINE CO.
10 Main Street Leetonia, Ohio, U. S. A.

Send for this catalog. It will tell you an interesting story that can be made profitable.

The HELM PRESS

Get into the Concrete Brick business, and get into it quick; but be sure you use the Helm Press, with its capacity of 15,000 Bricks or 1,500 Blocks per day. Our patented pressure system applies a facing in any color.

The HELM BRICK MACHINE COMPANY
987 Mitchell Street
Cadillac, Mich.



Parks "Old Reliable"
Circular rip and cross-cut saw. 12 in. jointer. Boring machine
$175
f.o.b. Cincinnati

ON the job or in the shop this Parks woodworker pays for itself many times over in a single season. Costs less than the wages of one man for *two months!* Works for you all your life without one cent of pay, repairs, or time off. And the price is so low that any man in business for himself cannot afford to be without a Parks.

Saves the hard work on sawing, planing, jointing, boring, and speeds your work up six to eight times. Angle-steel frame, electric-welded at every joint. As strong and rigid as cast iron *at one-fourth the cost.* All steel table. All Parks machines are guaranteed 10 years.

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Canadian Factory: 200 Notre Dame East, Montreal, Can.

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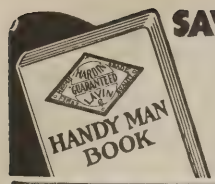
PARKS
WOODWORKING MACHINES



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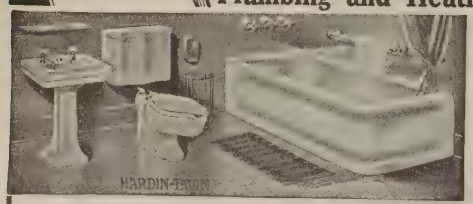
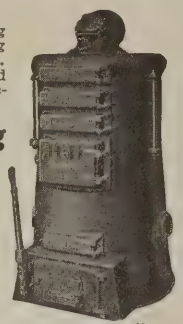
Plumbing and Heating





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$500,000.00 Plants Behind Our Guaranty

Hand Power Elevators and Dumbwaiters

WE carry standard sizes in stock ready for immediate shipment. Special sizes and types made up and shipped within four days.

Full dimensions for everything and blue prints with each outfit.

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157 West 15th Street New York, N. Y.

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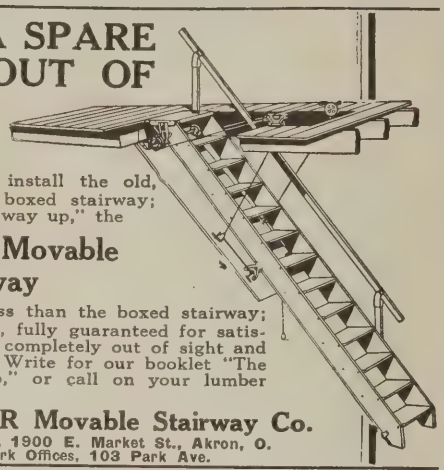

YOU need not install the old, space-taking boxed stairway; use the "modern way up," the

BESSLER Movable Stairway

IT even costs less than the boxed stairway; is light, strong, fully guaranteed for satisfaction; folds up completely out of sight and out of the way. Write for our booklet "The Modern Way Up," or call on your lumber dealer.

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You can be sure of getting this if you specify Energy equipment when you build.

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Our plan book, "Small Homes of Character," contains 50 examples of 4, 5, 6, and 7 room homes. Plans, Specifications, Bills of Material and Cardboard Models are available for each house.

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YOUR attention is invited to the B. & B. Line of Heating Specialties, including the B. & B. Air Line System of Steam Circulation, Temperature Control System (All-Metal Thermostat, Pneumatic Valve), Multiflex Valve, Modulation Valve, Multiflex Trap, Vacu-Trap, Vacu-Stat, Blast Trap, Steam Damper Regulator and Hot Water Damper Regulator.

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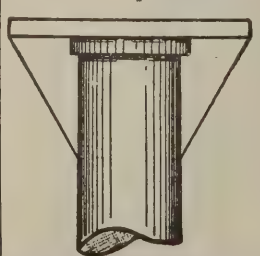
Crex Patent Columns are made with an outer shell of steel, filled with concrete, topped with a patented all-steel bracket cap that makes it the strongest support of its class on the market.



These columns have been installed in about 17,000 buildings in various parts of the United States because of their economy, absolute reliability, safety, strength and good appearance.

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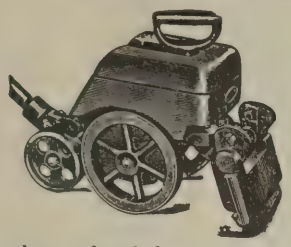
Floors surfaced "The Triple 'A' Way" look better under the varnish because—



The Triple "A" does a complete job right up to the base and corners, with the result that the entire room shows a uniform finish.

The Triple "A" is a scraper and sander combined, and is adaptable for all kinds of work—from taking off joints and edges at the rate of 3,000 square feet per day, to the finest kind of cabinet finish. It can be operated at three different working weights — for joint and edge work, whole surface new work, or resurfacing old and varnished floors.

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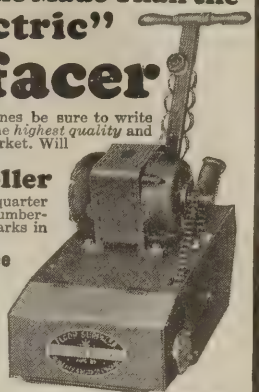
There Is No Better Machine Made Than the "Lightning Electric" Floor Surfacer



If you are interested in Floor Surfacing Machines be sure to write for the literature on the "Lightning Electric"—the *highest quality* and most *economically priced* floor surfacer on the market. Will do the work of six to eight men and do it better.

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The "Lightning Electric" will surface right up to quarter round without the use of the Old-Fashioned and cumbersome side roller. Leaves NO waves or chatter marks in the roughest floors—will NOT vibrate.

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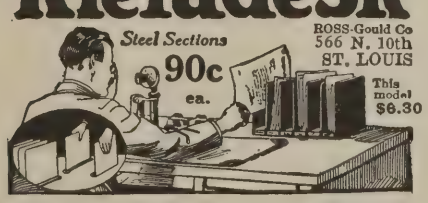

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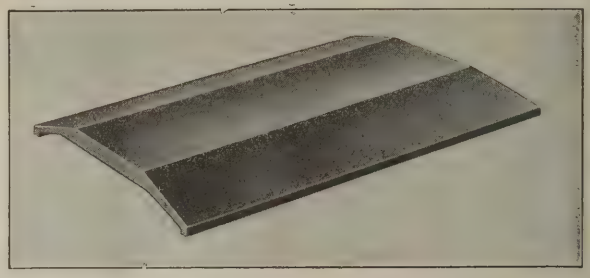

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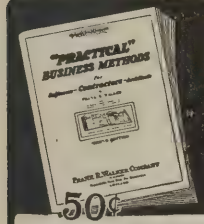

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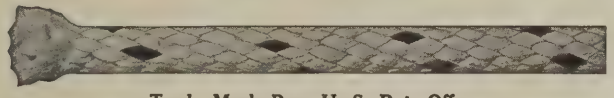

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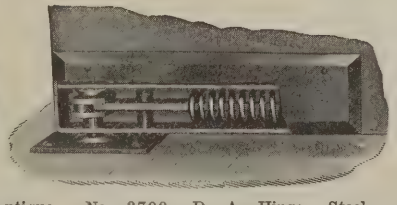

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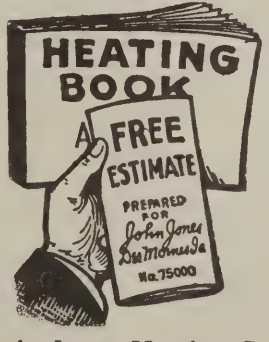

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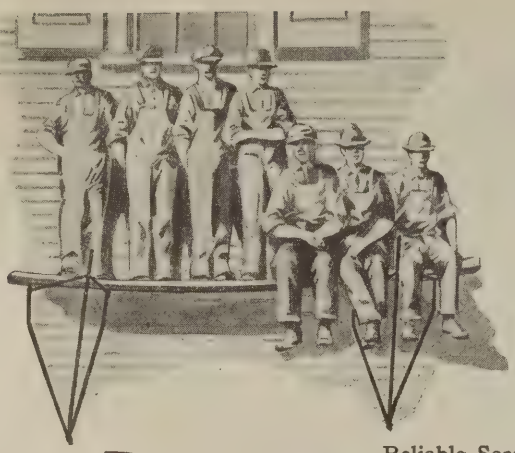

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You can see for yourself how Reliable Scaffold Brackets work. We ship on approval C. O. D. See them before you pay a penny. Write for our catalog and price list.

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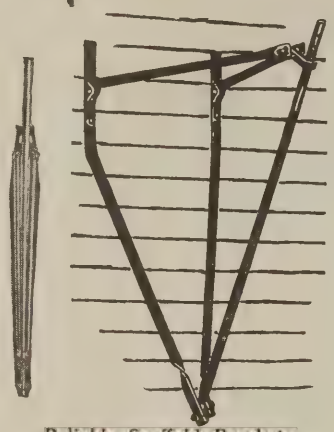
Dept. N-12 **Ashland, Ohio**



Reliable Scaffold Bracket Folded and Open

Reliable Scaffold Brackets

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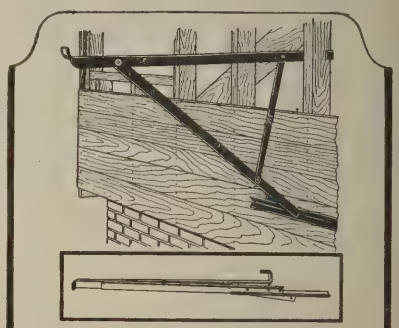
No holes to plug after they are removed



Hook Type Bracket—hooks around studding. Folds compactly. An excellent bracket for those who prefer it. Write for price list.

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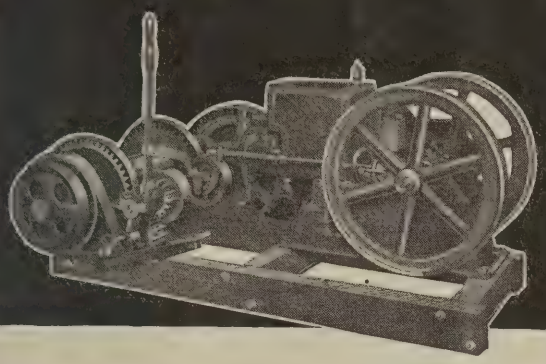

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Also built in non-reversible type, with or without power, as illustrated below.

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Formerly Waterloo Cement Machinery Corporation

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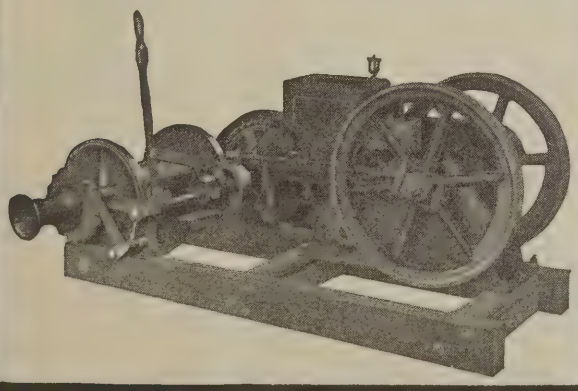

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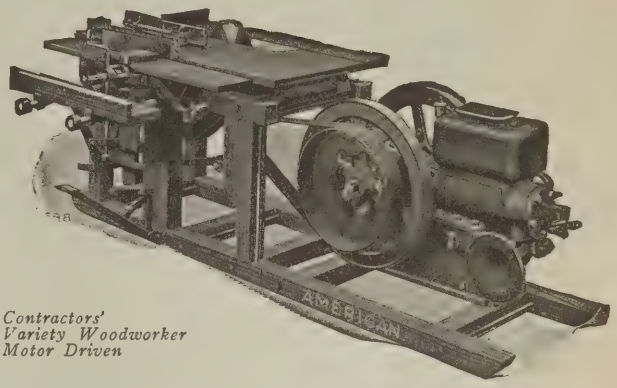


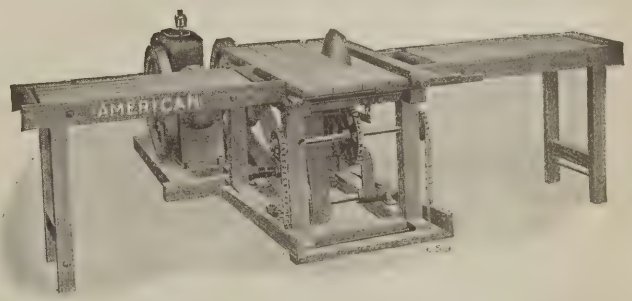
Contractors' Variety Woodworker Motor Driven

Costs eat profits. Don't let the high cost of man-power eat into the profits on your woodworking jobs. Get these motor-driven woodworkers behind your production. The Contractors' Variety Woodworker makes every cut needed in building and makes it better and more quickly. The Combined Rip and Cut-off Saw is for contractors and builders who handle heavy timber for bridges, docks, concrete forms and the like. Both machines are sturdy and accurate and both are **"Americans."** That means—dependable.

Bulletin No. 79 gives a lot of profit-bearing facts about American Woodworkers and Saw Mills. Write for it today.

American Saw Mill Machinery Co.

61 Main St., Hackettstown, N. J.
1361 Hudson Terminal Bldg.

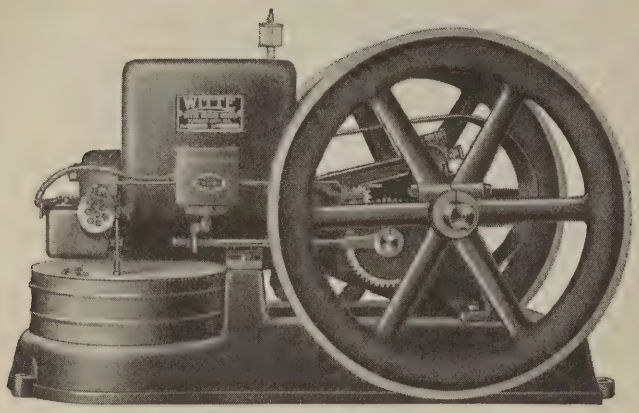


Combined Rip and Cut-off Saw Motor Driven

AMERICAN

Saw Mills and Woodworkers

DEPENDABLE!



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It takes a ruggedly built engine to stand up year after year under the grinding, racking strain of contracting work. So for many years Contractors, with an eye on the "cost-sheet," have used the WITTE Throttling-Governor Engine — steady performance at the lowest possible cost EVERY DAY.

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Has the most efficient Throttling-Governor.

Equipped with the famous WICO (High-tension) Magneto.

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Throttling Governor Engine

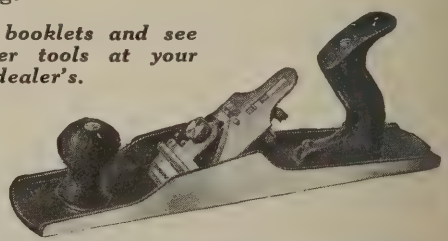
The SARGENT Cutter of Chromium Steel HOLDS ITS EDGE

Almost as sharp as a razor blade, even after considerable planing! With, against, and across the grain the Sargent Auto-Set Bench Plane cuts smoothly and cleanly. And with the auto-set feature the cutter is removed, honed, replaced, and shaving away in a jiffy with the original adjustment unchanged.

SARGENT PLANES— AND SQUARES

The Sargent Steel Pocket Plane and the Steel Block Plane are great for the finishing touches and for working in restricted quarters. Sargent Squares should also be on every work bench and particularly convenient is the Sargent Steel Take-Down Square which fits the popular shoulder kit. The tables of measurements stamped on all Sargent Squares are clear, correct and time-saving.

Write for booklets and see these better tools at your hardware dealer's.

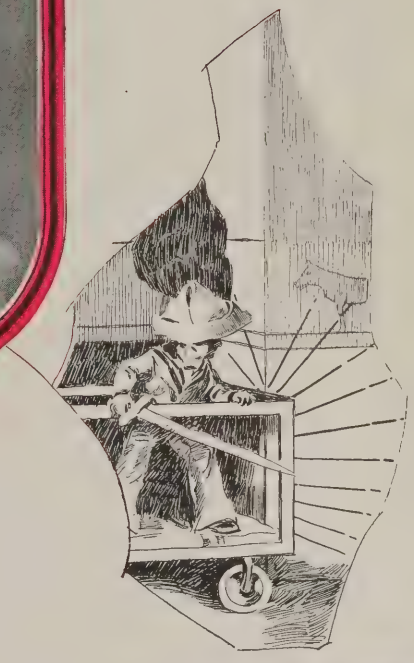


SARGENT & COMPANY, MFRS.

52 Water Street New Haven, Conn.

SARGENT

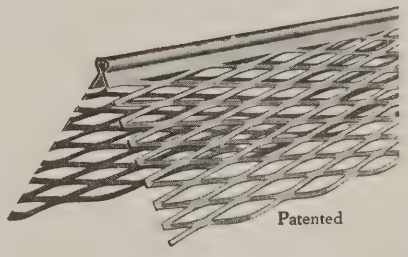
Tools & Hardware



Crash—but the corner's safe! In the modern home, MILCOR metallic construction has not only made walls truer and more beautiful, but has provided a rigid metal base that keeps them permanently so. These homes are rooms in which to *live* — children can play — furniture can be moved. MILCOR walls take blows that would shatter ordinary plaster construction for they are formed on a foundation of expanded steel.

As an instance of what this better construction affords — for exposed corners, MILCOR *Expansion* Corner Bead is wired or nailed directly over the *Stay Rib* Lath. The plaster, when placed, clinches through the mesh of both the bead and lath, making the corner the strongest part of the entire wall. The true, *drawn* bead imbedded in the plaster acts as a guide while the wall is under construction, which assures an even surface and uniform depth. In the finished wall the unseen metal edge stands guard to take blows that would shatter ordinary plaster corners, and dissipates their force through the expanded metal wings without cracking or chipping.

Complete information as to the use of these modern building products or where they may be obtained will be supplied promptly on request.



MILCOR *Expansion* Corner Bead is wired, nailed or stapled directly over the metal lath—the plaster, when placed, *keying* through the mesh of both for great strength. The perfect cold-drawn bead (just flush with the surface of the finished wall) although hidden from view, takes and dissipates without damage, blows that would shatter ordinary plaster corners. MILCOR Metallic Construction makes rooms *permanently* beautiful.

MILCOR ***Expansion*** *Metal Trim*
MILCOR ***Expansion*** *Corner Bead*
MILCOR ***Expansion*** *Base Screed*
MILCOR ***Invisible*** *Picture Molding*
MILCOR ***Netmesh*** *Metal Lath*
MILCOR ***Stay Rib*** *Metal Lath*

Milwaukee Corrugating Company
Milwaukee · Kansas City · Minneapolis

MILCOR
METALLIC BUILDING PRODUCTS

Look for ALL these qualities when you buy roofing

Point by point, Beaver Vulcanite meets *every* demand you make of roofing material.

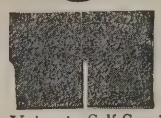
First, you demand a roof which is storm-proof. Beaver Vulcanite is made of nature's own waterproofing—asphalt. With patented Vulcanite shingles, your roof will have a *triple-thick* covering where protection is most needed, and double-thick elsewhere.

You want a fire-safe roof. The National Board of Fire Underwriters vouches for the fire-resisting qualities of Vulcanite slate-surfaced roofing. You want a durable roof; users who have known Vulcanite since it was introduced 25 years ago attest to its long life.

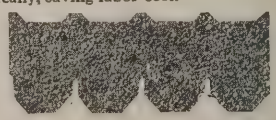
The warmth and depth of Vulcanite's non-fading colors and the distinctive shingle designs give you *beauty.*

Vulcanite, too, is a non-conductor of heat and cold; keeps your home warm in winter and cool in summer.

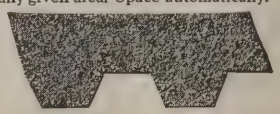
Test each quality of Beaver Vulcanite yourself; learn all about this wonderful roofing material. Send coupon for free sample and complete information.



Beaver Vulcanite Self-Spacing Shingles have a patented shoulder which seals the roof above the notch against driving rain or snow. Space automatically, saving labor cost.



Beaver Vulcanite Doubletite Slabs build a roof of tile-like effect, triple-thick at butts and double-thick at slots. Fewer shingles are needed to cover any given area. Space automatically.



Beaver Vulcanite Hexagon Slabs have a distinctive design and produce a roof triple-thick at the butts and double-thick elsewhere. They are the equivalent of four shingles in one. Space automatically. Especially suitable for laying right over old shingles.

Beaver Vulcanite is slate-surfaced in rich Italian red, sage green and distinctive blue-black. Produced also in plain, slate-surfaced or sand, mica or talc-surfaced rolls in various weights.

THE BEAVER PRODUCTS COMPANY, Inc.

Thorold, Canada BUFFALO, N. Y. London, England

Manufacturers of Beaver Wall Board, Beaver Vulcanite Roofing, Beaver Plaster Board and Plaster Products

BEAVER VULCANITE ROOFING

COUPON

The Beaver Products Co., Inc.,
Buffalo, N. Y. Dept. 11

Gentlemen: Please send me free sample of Beaver Vulcanite roofing; also Vulcanite booklet.

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